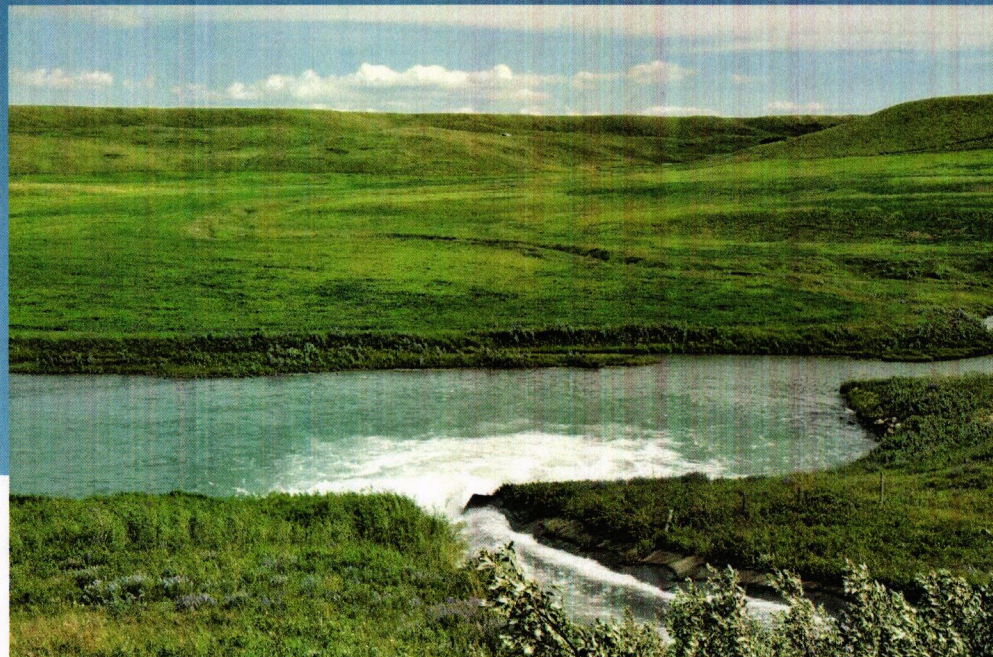


2021 - Summer Drought & Water Supply Forecast

Water Policy Interim Committee

July 15, 2021

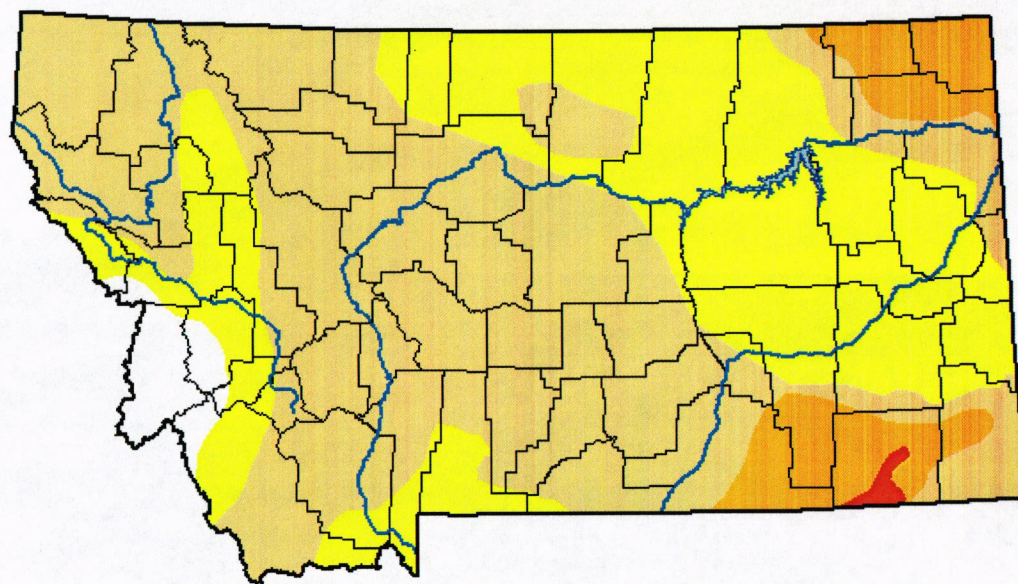
Michael Downey – DNRC, Water Management Bureau



Saint Mary's Canal – The old drop 5 – June 28, 2017

U.S. Drought Monitor Montana

October 13, 2020
(Released Thursday, Oct. 15, 2020)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	2.78	97.22	61.67	7.77	0.36	0.00
Last Week 10-08-2020	11.87	88.13	42.28	7.29	0.36	0.00
3 Months Ago 07-16-2020	64.67	35.33	8.65	2.17	0.00	0.00
Start of Calendar Year 01-02-2020	89.74	10.26	0.07	0.00	0.00	0.00
Start of Water Year 10-01-2020	11.86	88.14	40.59	4.22	0.02	0.00
One Year Ago 10-17-2019	99.91	0.09	0.00	0.00	0.00	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center



droughtmonitor.unl.edu

U.S. Drought Monitor Montana

July 13, 2021

(Released Thursday, Jul. 15, 2021)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	91.44	72.03	36.42	0.00
Last Week 07-06-2021	0.00	100.00	84.34	65.23	25.90	0.00
3 Months Ago 04-13-2021	13.53	86.47	44.64	18.74	8.46	0.00
Start of Calendar Year 12-29-2020	36.37	63.63	34.41	8.27	0.36	0.00
Start of Water Year 09-29-2020	11.86	88.14	40.59	4.22	0.02	0.00
One Year Ago 07-14-2020	64.67	35.33	8.65	2.17	0.00	0.00

Intensity

 None	 D2 Severe Drought
 D0 Abnormally Dry	 D3 Extreme Drought
 D1 Moderate Drought	 D4 Exceptional Drought

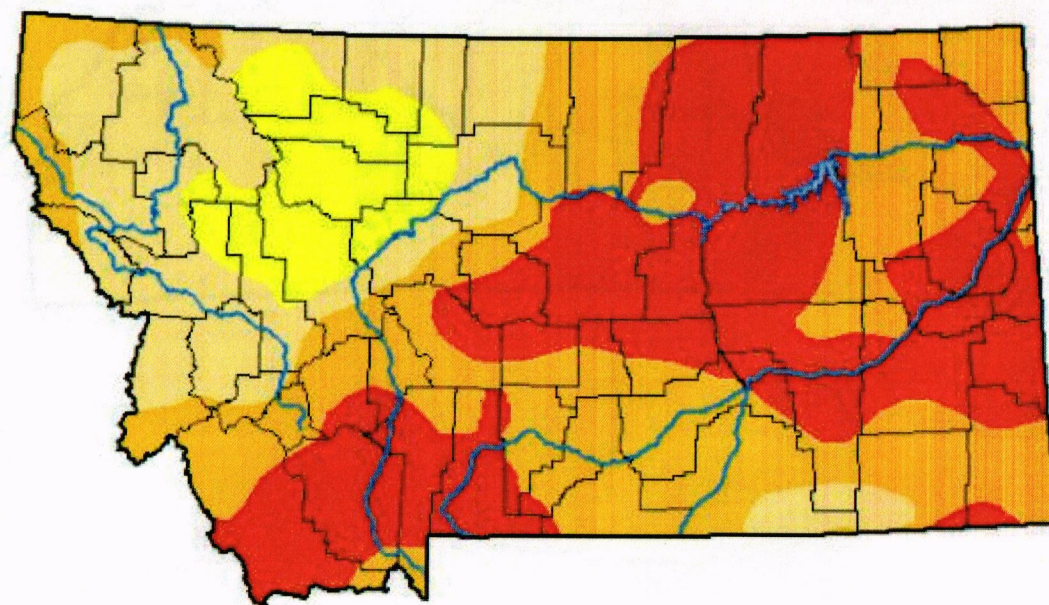
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu



U.S. Drought Monitor Montana

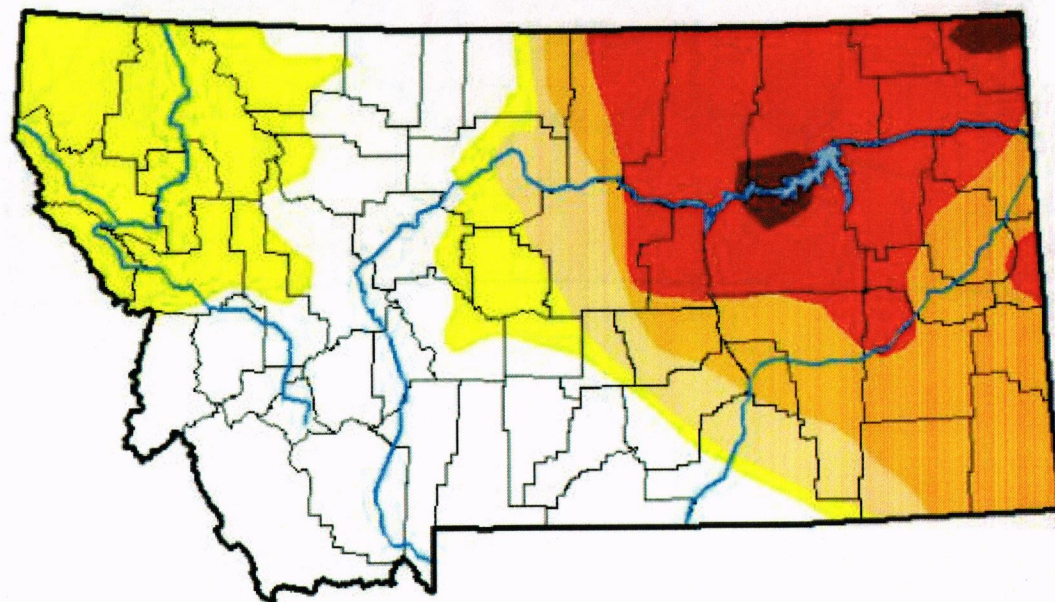
July 18, 2017

(Released Thursday, Jul. 20, 2017)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.59	65.41	45.40	37.74	22.00	1.54
Last Week 07-11-2017	45.80	54.20	44.72	37.74	22.00	0.00
3 Months Ago 04-18-2017	87.57	12.43	0.00	0.00	0.00	0.00
Start of Calendar Year 01-03-2017	74.25	25.75	4.87	0.00	0.00	0.00
Start of Water Year 09-27-2016	55.14	44.86	25.49	5.86	0.33	0.00
One Year Ago 07-19-2016	60.33	39.67	14.73	1.13	0.47	0.00



Intensity:

- D0 Abnormally Dry
- D3 Extreme Drought
- D1 Moderate Drought
- D4 Exceptional Drought
- D2 Severe Drought

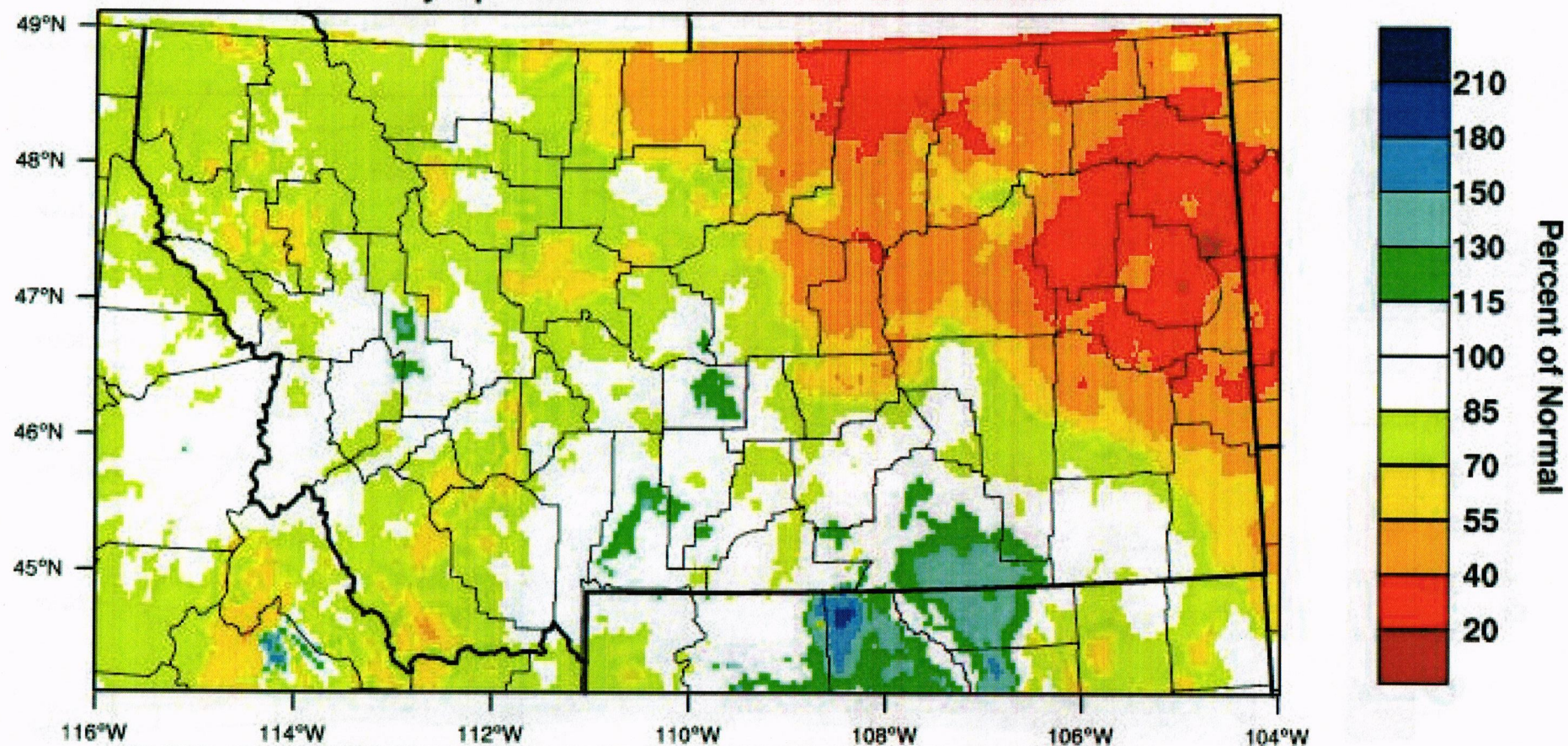
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Richard Heim
NCEI/NOAA

Montana - Precipitation

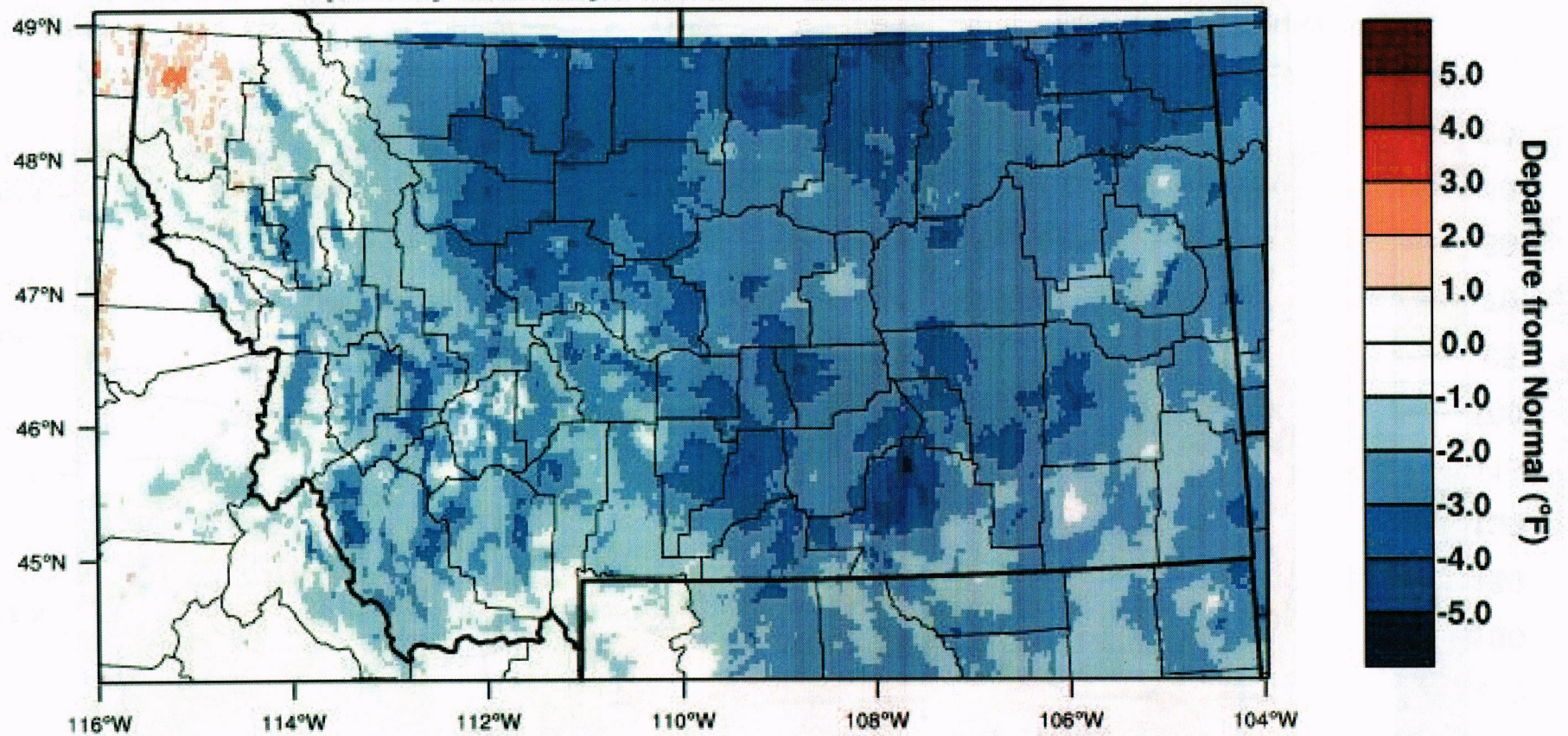
January-April 2021 Percent of 1981-2010 Normal



WestWide Drought Tracker. U Idaho/WRCC Data Source: PRISM (Prelim). created 16 MAY 2021

Montana - Mean Temperature

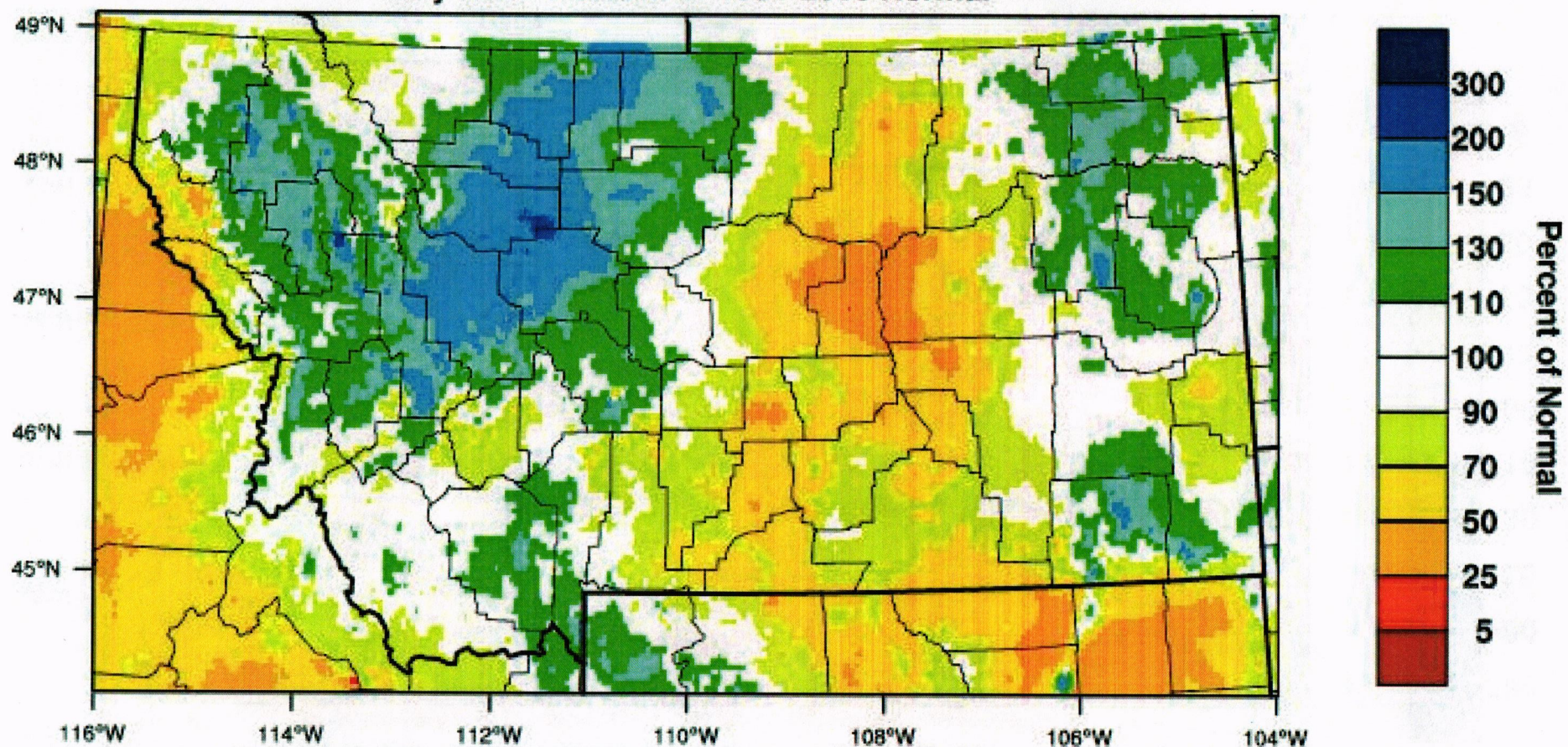
April-May 2021 Departure from 1981-2010 Normal



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 JUN 2021

Montana - Precipitation

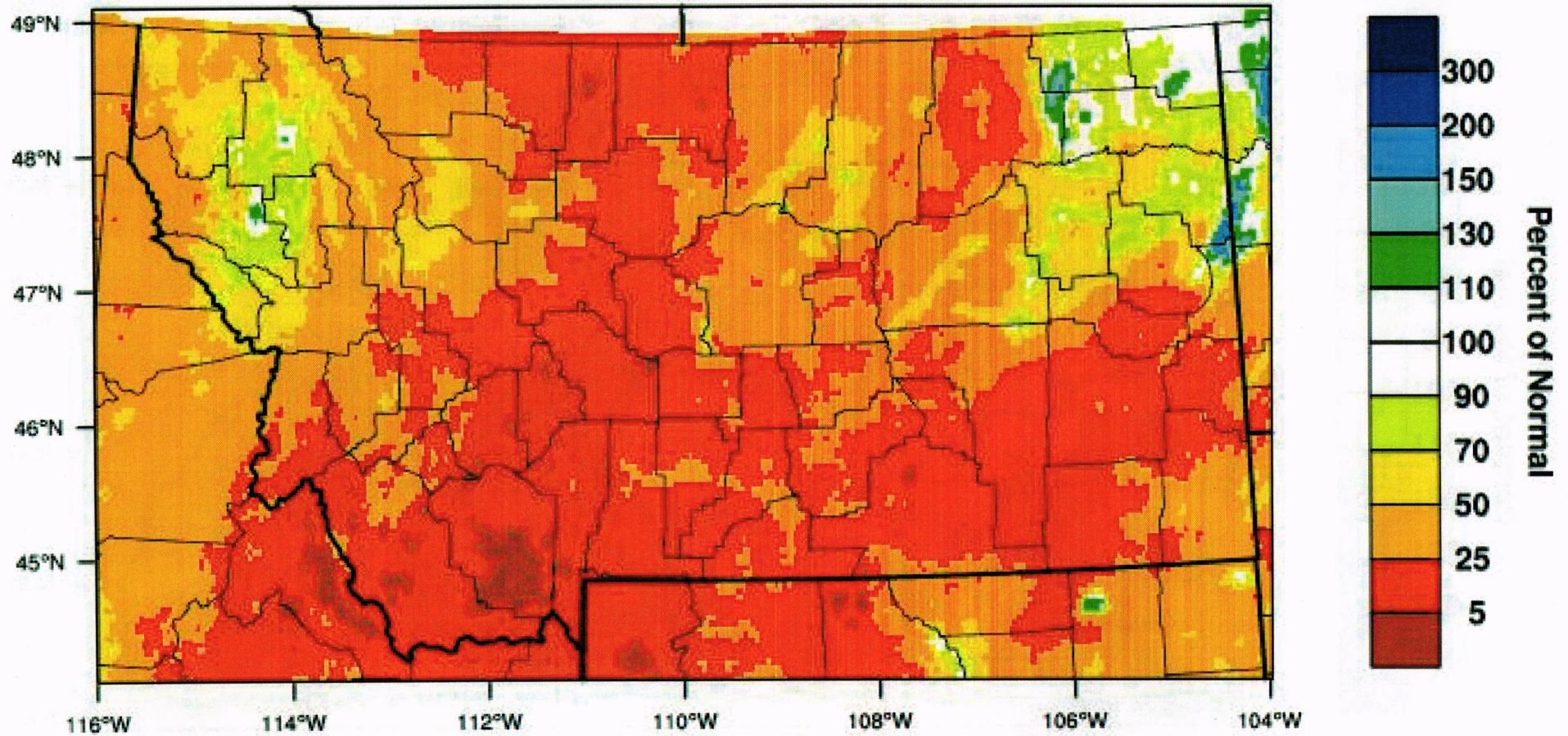
May 2021 Percent of 1981-2010 Normal



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 JUN 2021

Montana - Precipitation

June 2021 Percent of 1981-2010 Normal

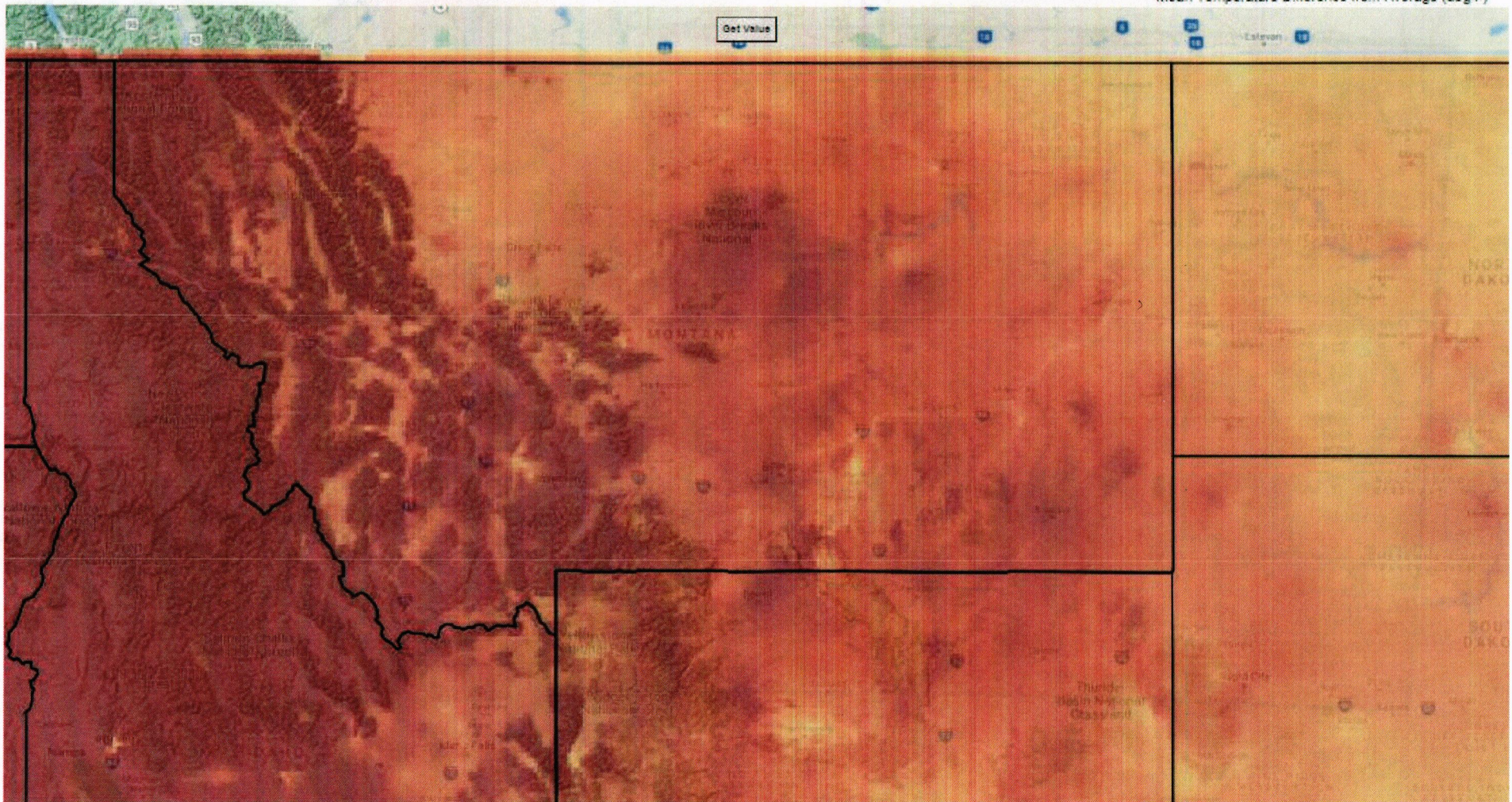
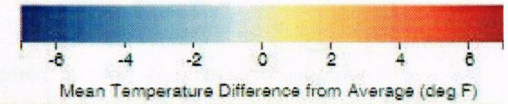


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 5 JUL 2021

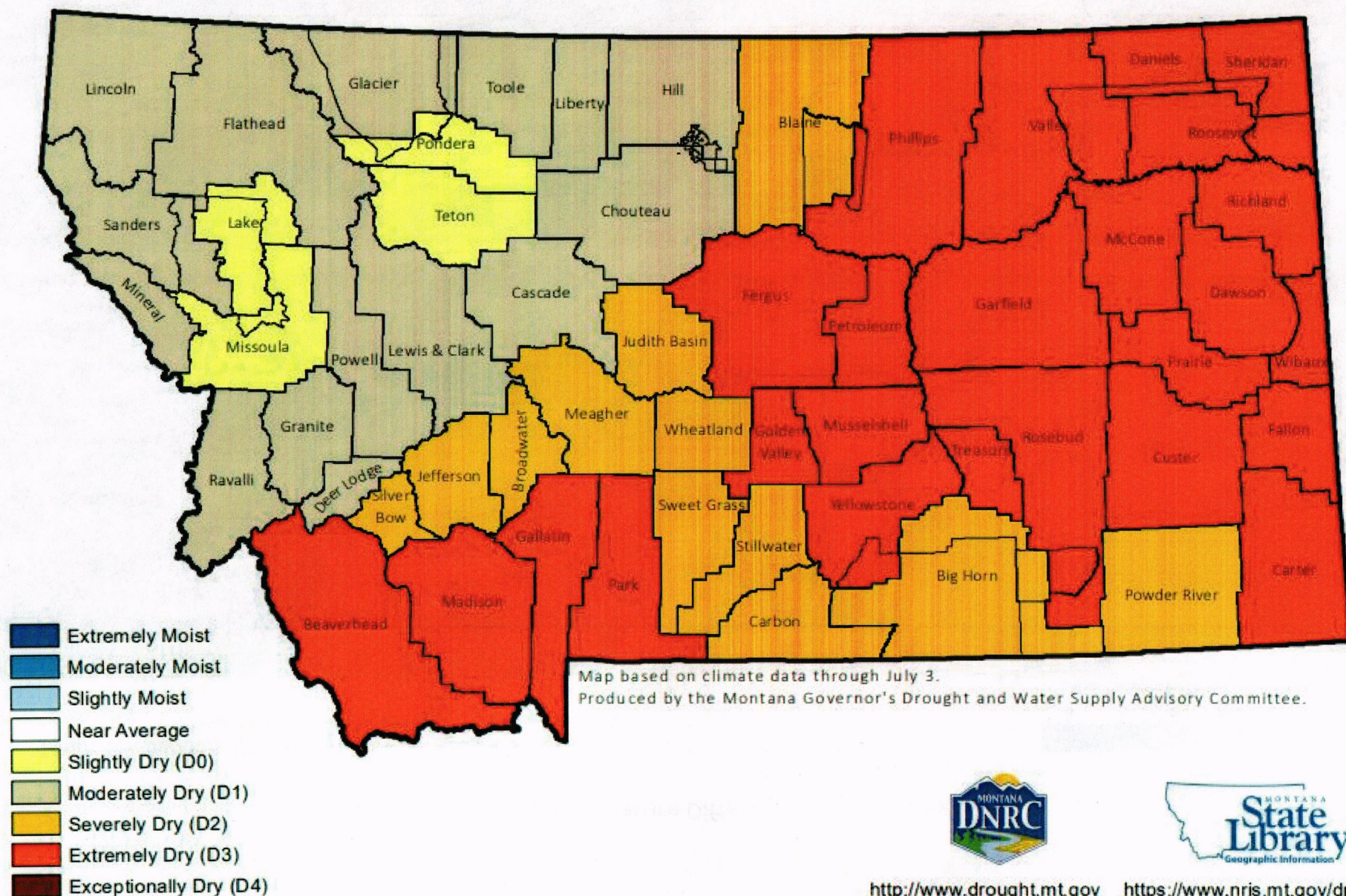
June 2021, Mean Temperature Difference from Average

Mean Temperature Difference from Average (gridMET)

2021-06-09 to 2021-07-08, Mean, vs. 1981 - 2010

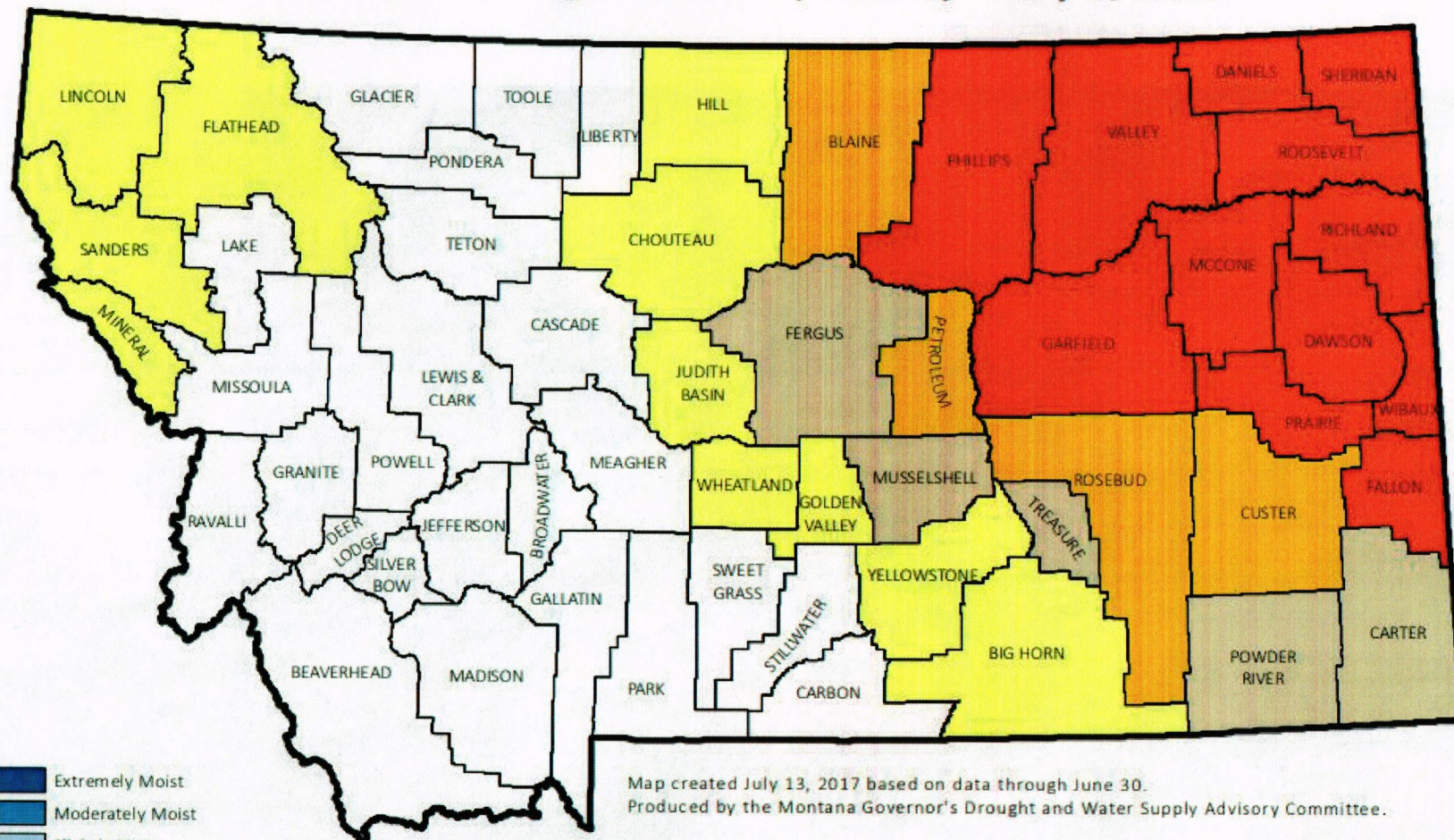


Montana Drought Status by County - July 7, 2021



<http://www.drought.mt.gov> <https://www.nris.mt.gov/drought>

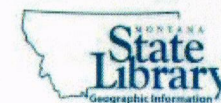
Montana Drought Status by County - July 1, 2017



- Extremely Moist
- Moderately Moist
- Slightly Moist
- Near Average
- Slightly Dry (D0)
- Moderately Dry (D1)
- Severely Dry (D2)
- Extremely Dry (D3)
- Exceptionally Dry (D4)

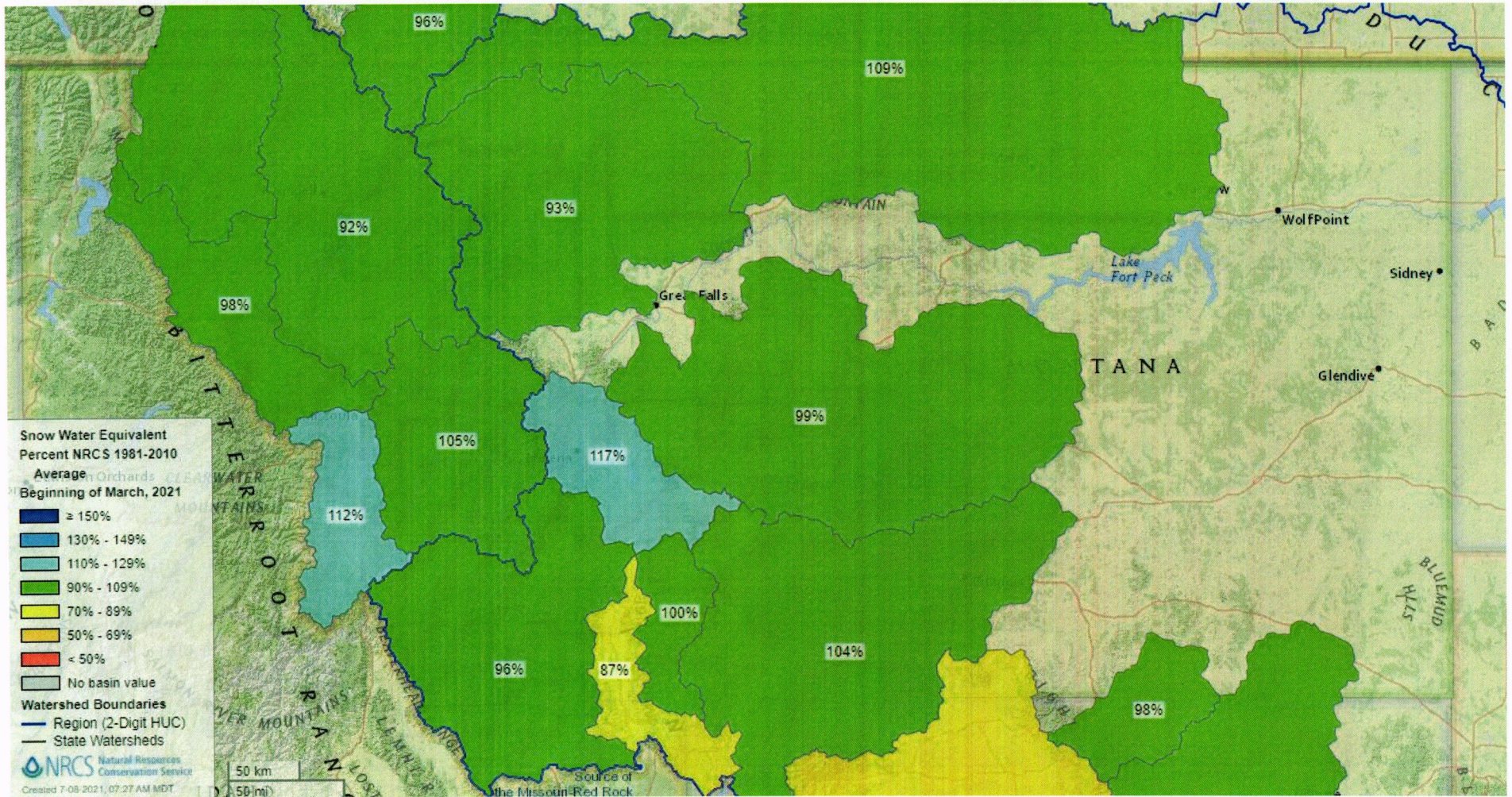


More information: <http://drought.mt.gov>

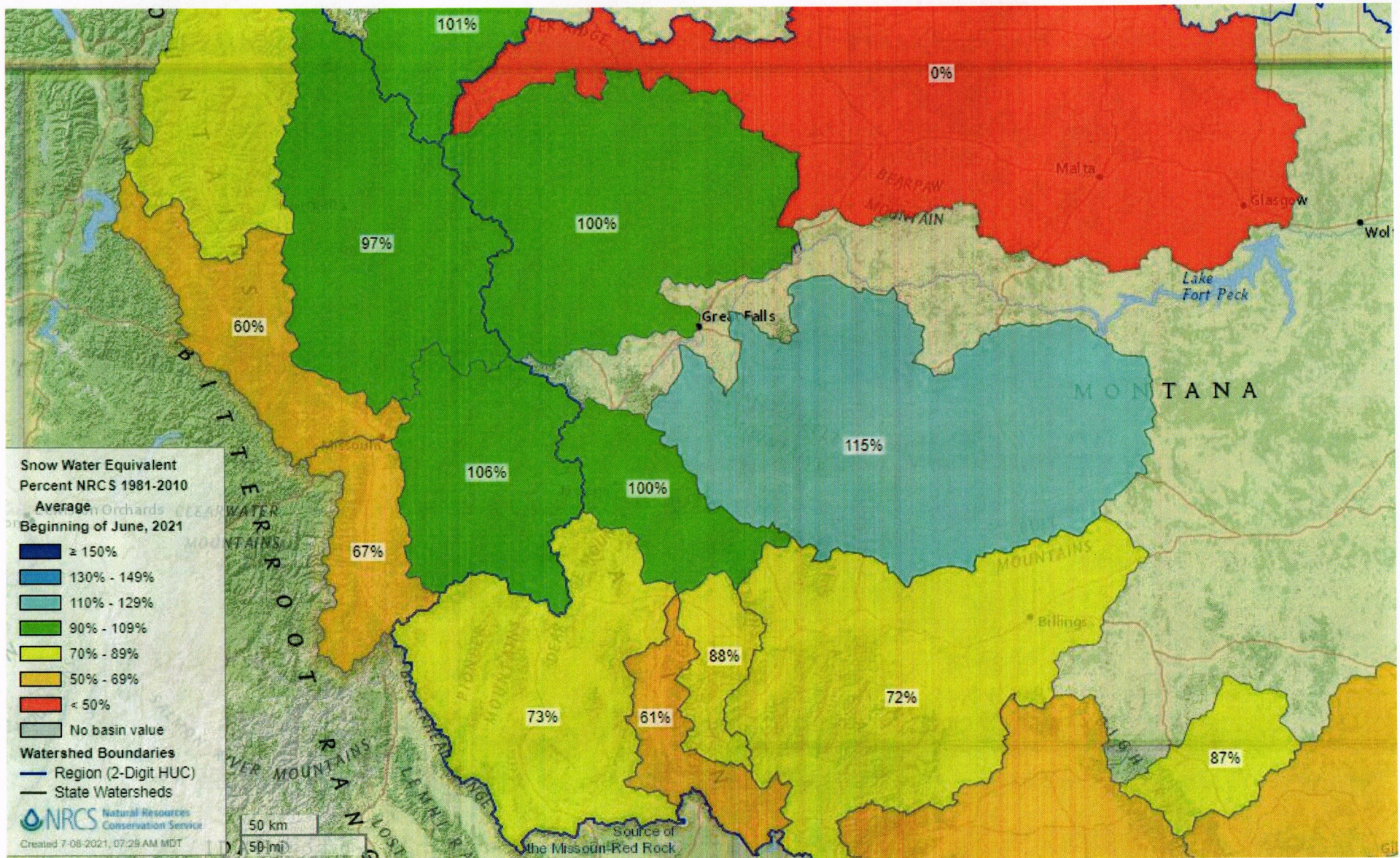


<http://nris.mt.gov/drought>

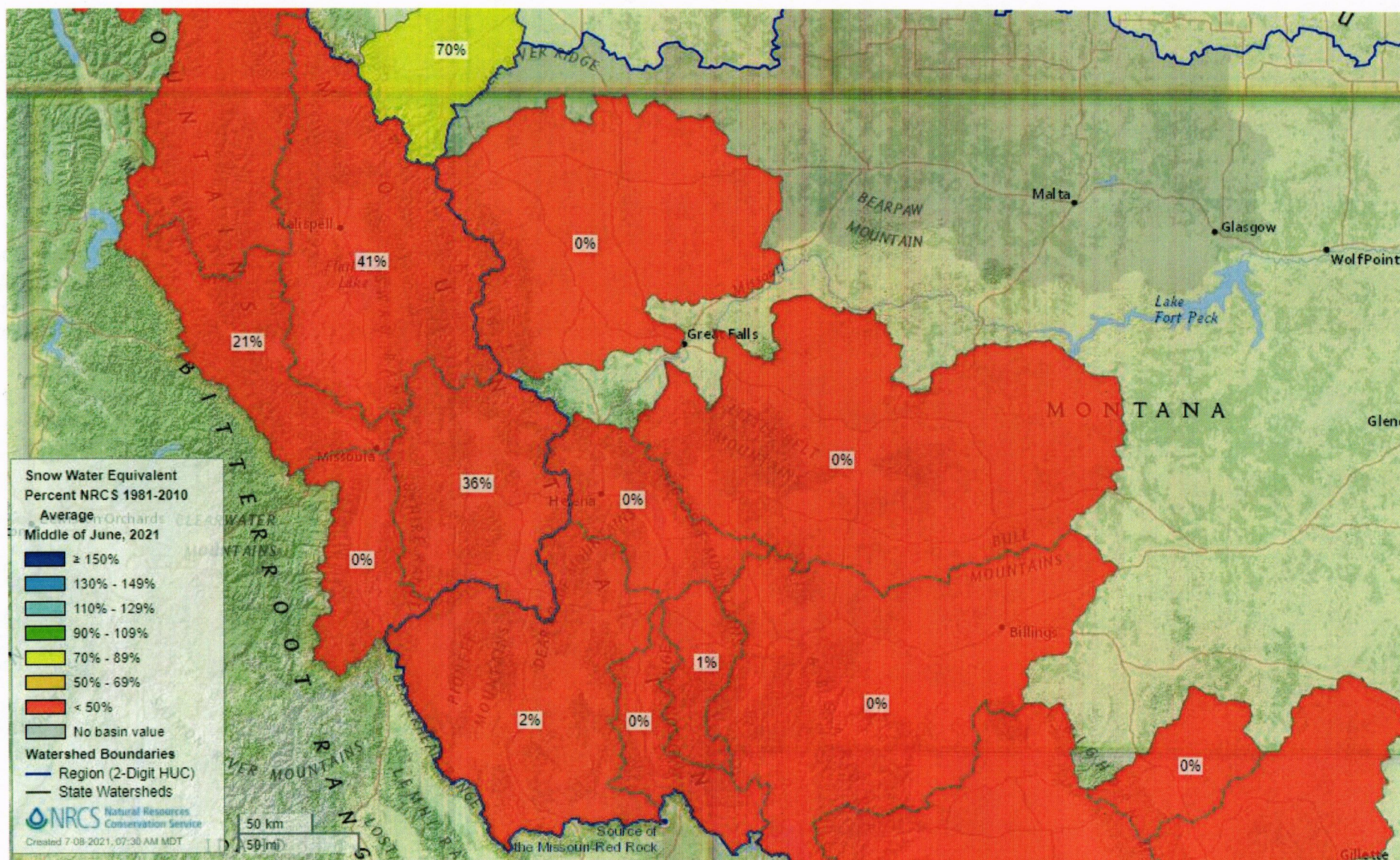
Snow Water Equivalent as a percentage of average, March 1, 2021



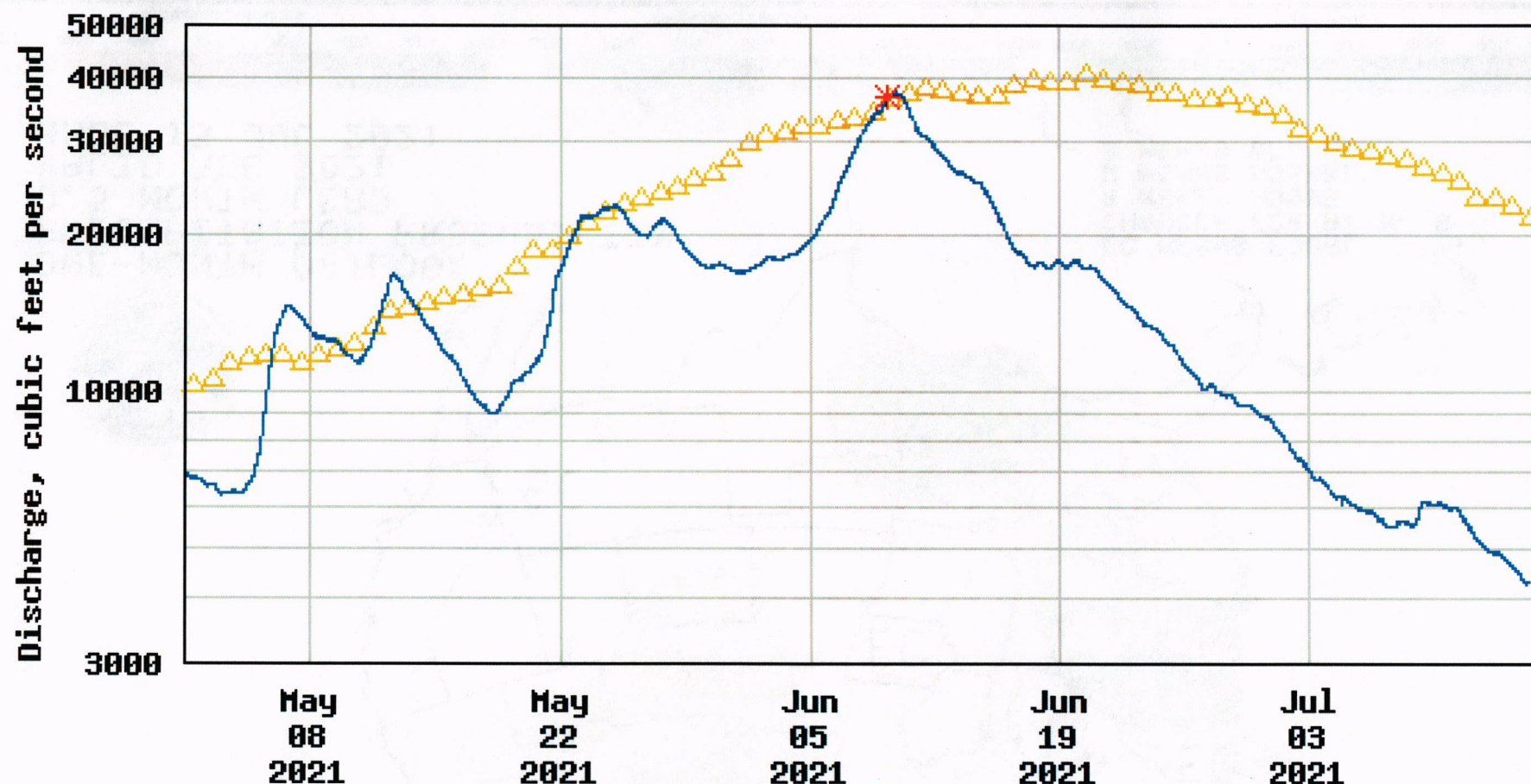
Snow Water Equivalent as a percentage of average, June 1, 2021



Snow Water Equivalent as a percentage of average, June 15, 2021



USGS 06329500 Yellowstone River near Sidney MT

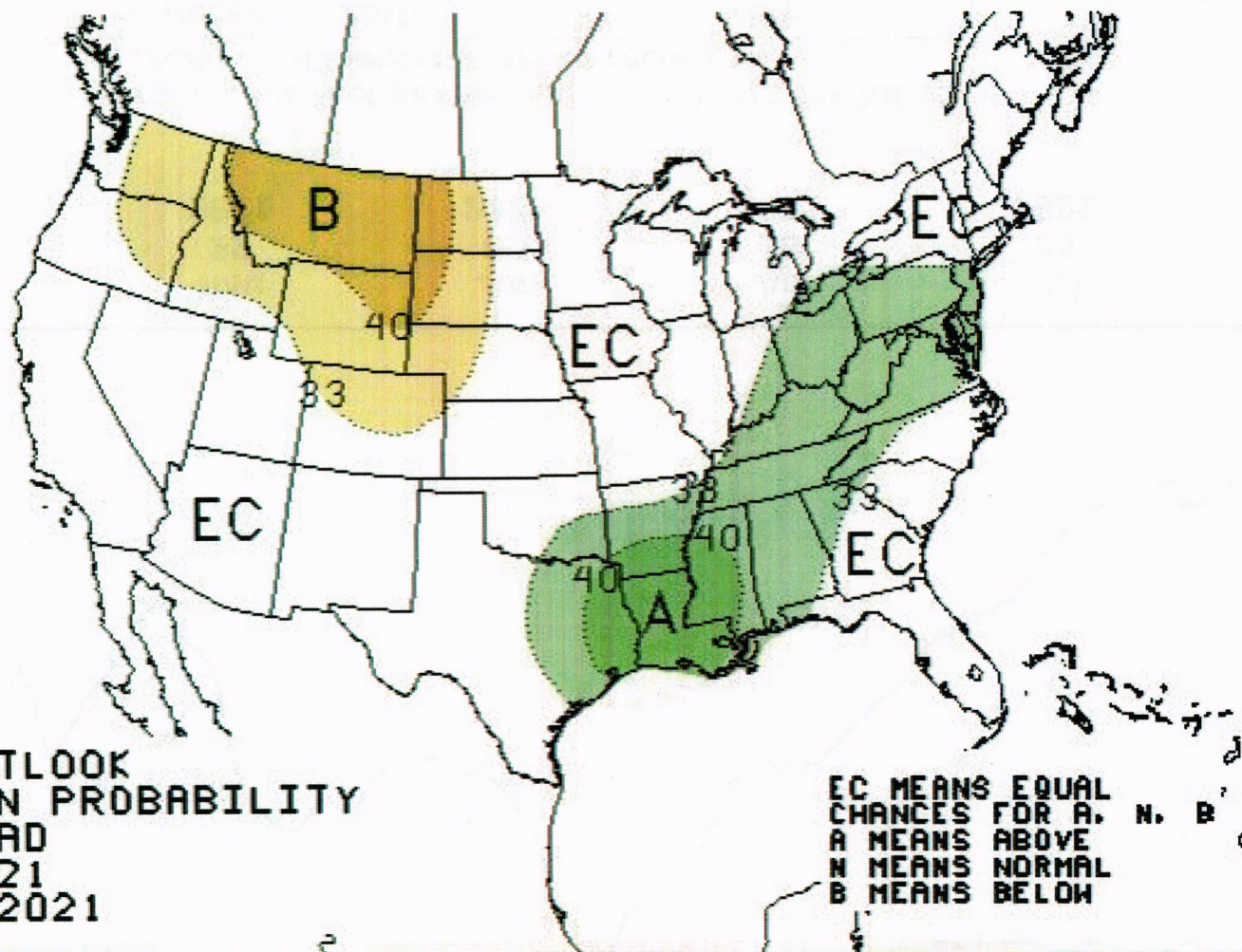


Daily discharge, cubic feet per second -- statistics for Jul 15
based on 108 water years of record [more](#)

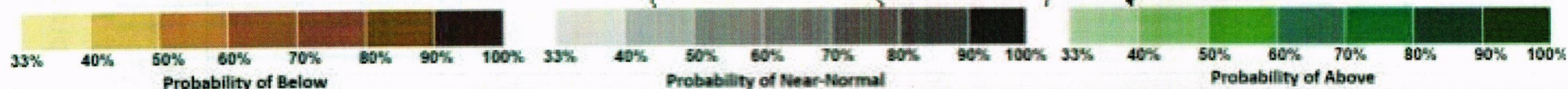
Min (1919)	Most Recent Instantaneous Value Jul 15	25th percent- tile	Median	Mean	75th percent- tile	Max (1915)
2780	4310	11700	21400	22600	31200	66000



ONE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID AUG 2021
MADE 15 JUL 2021

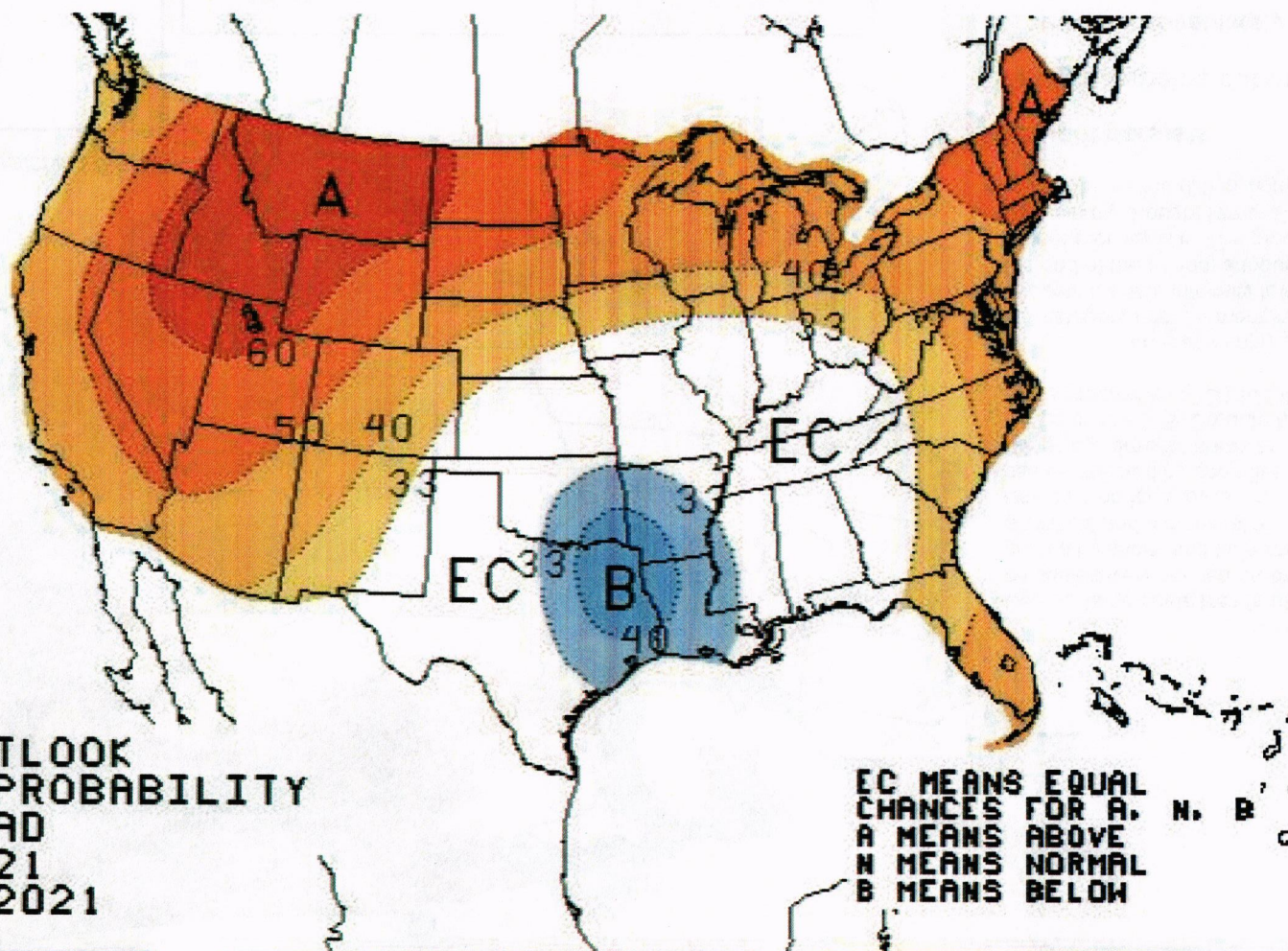


EC MEANS EQUAL
CHANCES FOR A. N. B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

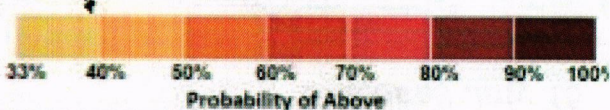
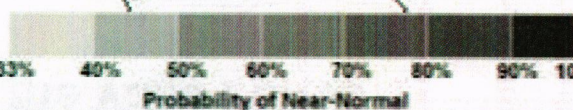
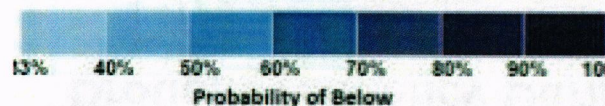




ONE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID AUG 2021
MADE 15 JUL 2021



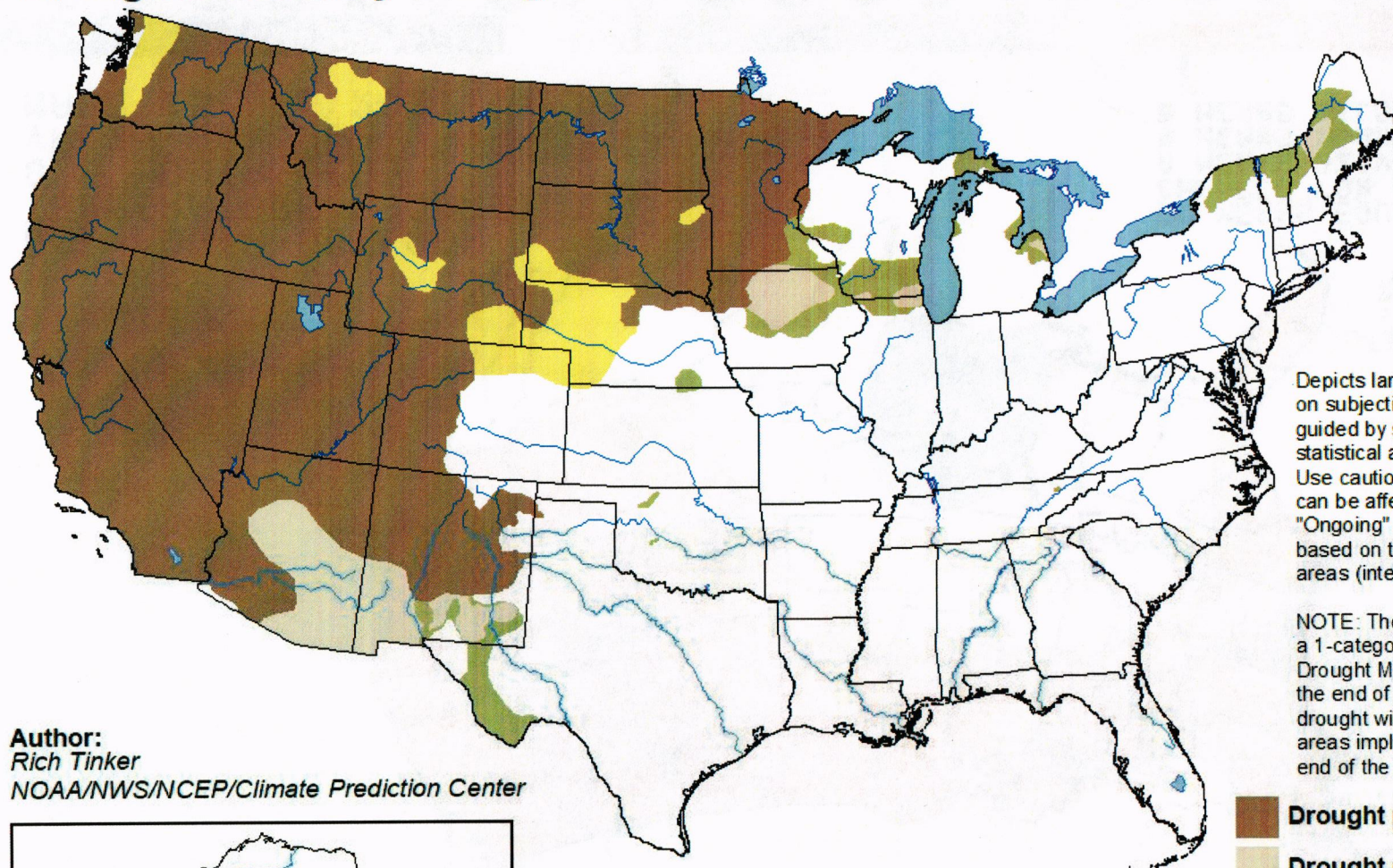
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for July 15 - October 31, 2021
Released July 15

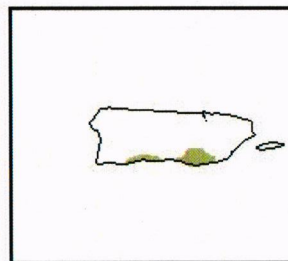
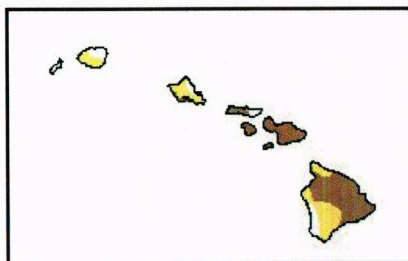
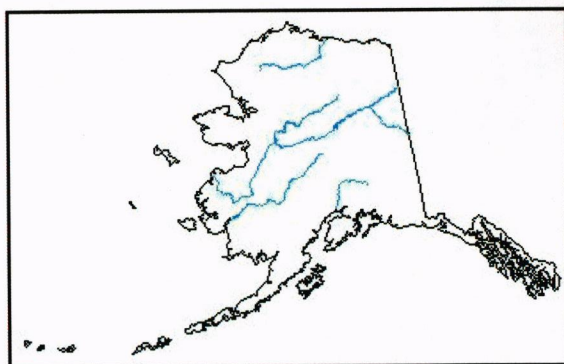


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely

Author:
Rich Tinker
NOAA/NWS/NCEP/Climate Prediction Center



<http://go.usa.gov/3eZ73>

STATE OF MONTANA
OFFICE OF THE GOVERNOR
EXECUTIVE ORDER NO. 11-2021

EXECUTIVE ORDER PROCLAIMING A STATEWIDE DROUGHT EMERGENCY
IN THE STATE OF MONTANA

WHEREAS, since December 1, 2020, a widespread and sustained abnormally warm and dry weather pattern has created worsening drought conditions in eastern, central, and southwest Montana due to a lack of soil moisture and precipitation, including moderate to extreme conditions in 69% of the state, including 48 counties and six reservations, with extreme conditions in 16% of the state, including the Fort Peck Tribal Nation, and 14 counties; and

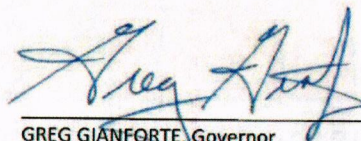
WHEREAS, a lack of snow cover on the eastern plains, and warmer than normal weather and windy conditions melted much of the late October and early November snowfall, and increased evaporation reduced soil moisture even further; and

WHEREAS, projected short- and long-range weather forecasts through at least July 31, 2021,

This Order is effective July 1, 2021.

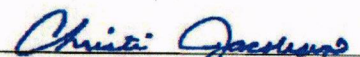


GIVEN under my hand and the GREAT SEAL of the
State of Montana this 15th day of July,
2021.



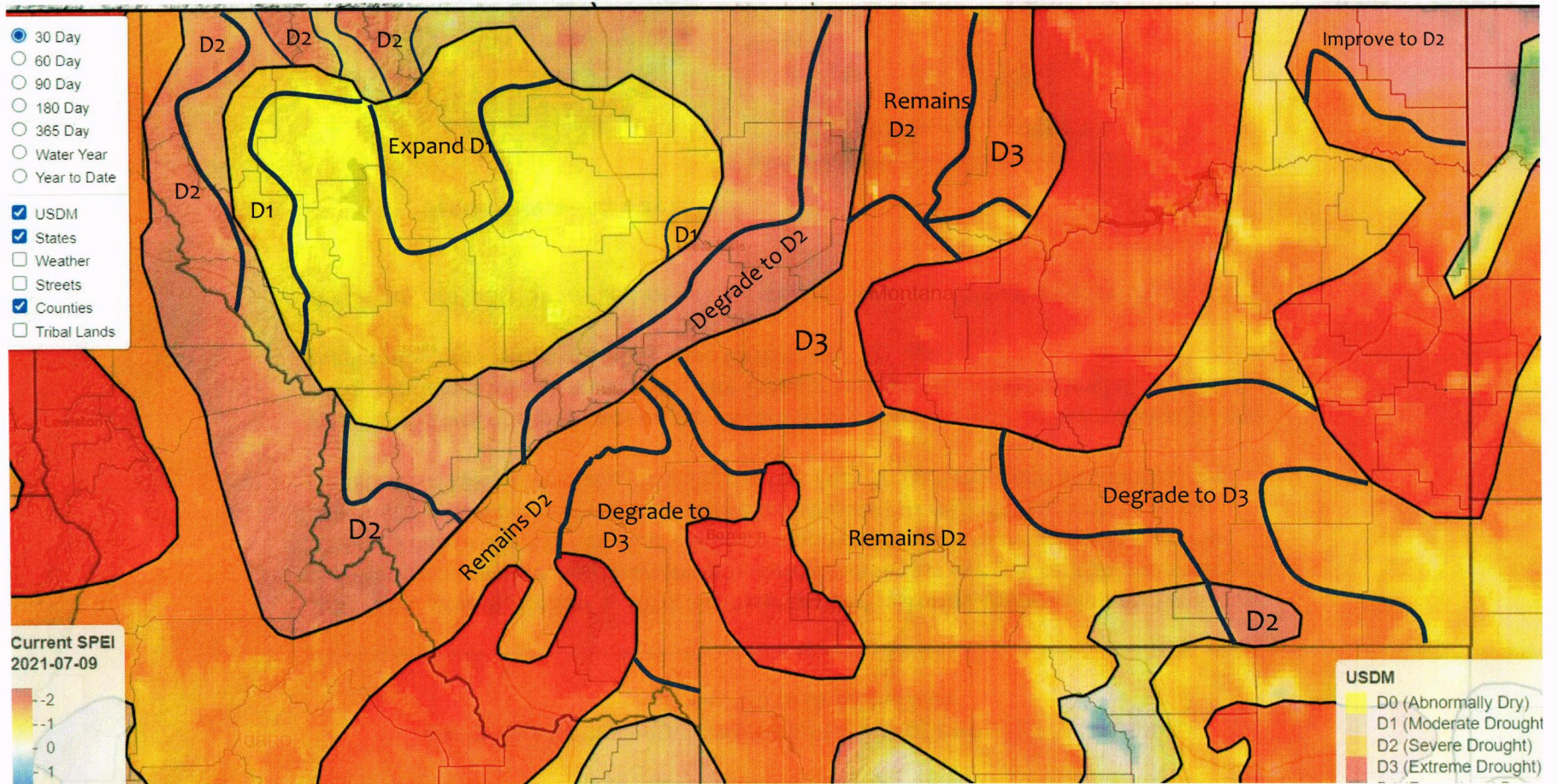
GREG GIANFORTE, Governor

ATTEST:



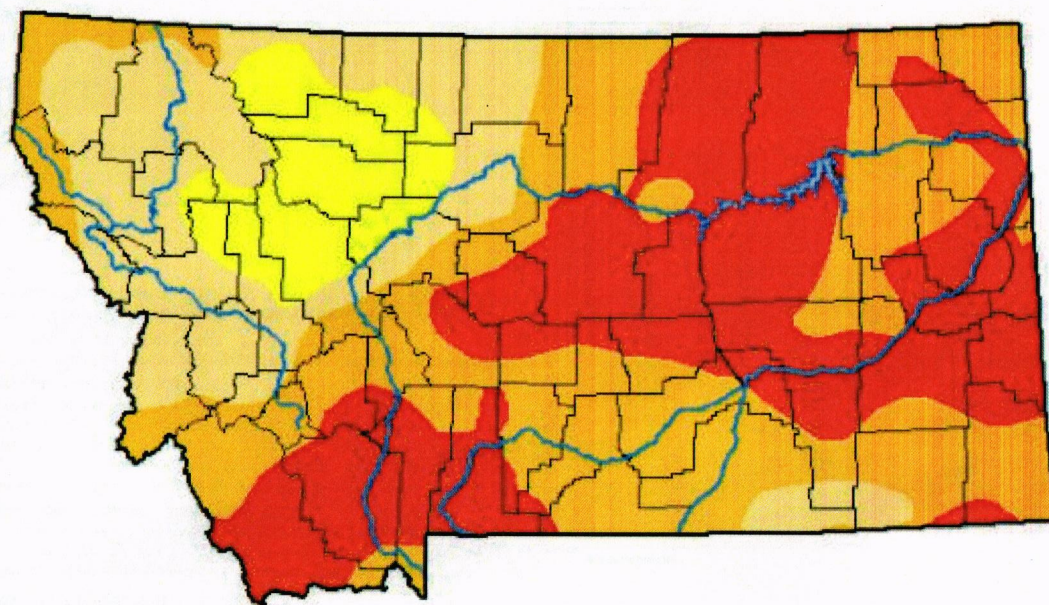
CHRISTI JACOBSEN, Secretary of State

MT USDM Recommendation 7-12-21 -Draft



U.S. Drought Monitor Montana

July 13, 2021
(Released Thursday, Jul. 15, 2021)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	91.44	72.03	36.42	0.00
Last Week 07-06-2021	0.00	100.00	84.34	65.23	25.90	0.00
3 Months Ago 04-13-2021	13.53	86.47	44.64	18.74	8.46	0.00
Start of Calendar Year 12-29-2020	36.37	63.63	34.41	8.27	0.36	0.00
Start of Water Year 09-29-2020	11.86	88.14	40.59	4.22	0.02	0.00
One Year Ago 07-14-2020	64.67	35.33	8.65	2.17	0.00	0.00

Intensity

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu

Montana Drought Impacts (Water Year 2021)



Overview Primary Sector Positive Reports Crop/Range Condition Crop Production Livestock Production Planting/Harvest Status Water Supply Habitat Recreation Industry Health Fire Notes/Photos Additional Functionality

How Dry or Wet is It?

Drought can affect wildfire, agriculture production, tourism, wildlife and many other areas important to Montana. The Montana Governor's Drought and Water Supply Advisory Committee provides the [Drought Impact Reporter - a live, ongoing questionnaire for reporting local drought impacts](#).

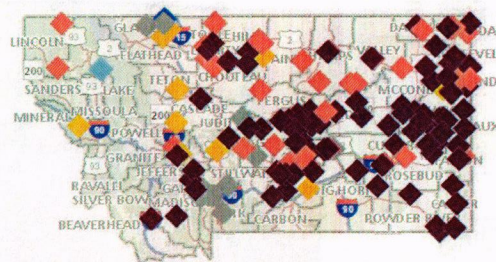
Explore the results of the Montana Drought Impact Reporter for the current water year (Oct. 1 to Sept. 30) by navigating through the various tabs. A map of all the results is located in the Primary Impact Type tab. There are also tabs with maps for each primary impact type and for crop and range conditions. A map with more functionality and a link to download a spreadsheet of the data is available under the last tab ("Additional Functionality").

Maps are updated daily. When a new report is received through the questionnaire it is automatically added to the maps.

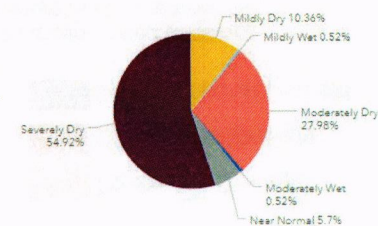
For more information visit [Montana Department of Natural Resources & Conservation Drought Management](#) or Montana State Library [Drought Status Maps](#).

How dry or wet is it?

- Severely Dry
- Moderately Dry
- Mildly Dry
- Near Normal
- Mildly Wet
- Moderately Wet
- Severely Wet



How Wet or Dry is it?



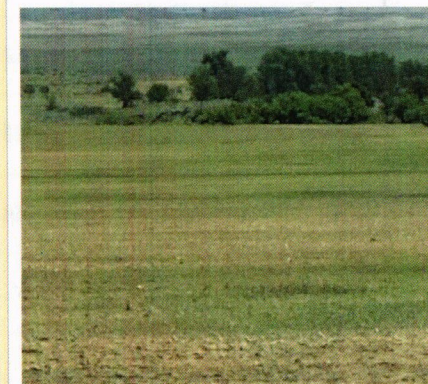
How Wet or Dry is it?

Crop Conditions

Range Conditions

1 of 23

7/5/2021, 12:00 PM - Carter County



Barley seeded the first of May

Montana State Library

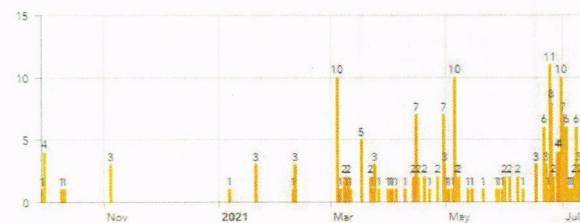
Overview Photos

Number of Reports Since 10/1/2020

193

Total Reports

Number of Reports by Date



Reports by Date

Reports by Primary Sector

Reports by County

Photos by Date



Questions/Comments?

<http://dnrc.mt.gov/divisions/water/drought-management>

Contact Information:

Michael Downey
mdowney2@mt.gov
406-444-9748

Montana Drought Forecast Report – Summer 2021



Ungerminated wheat field near Wolf Point, 2017

Prepared by DNRC on behalf of the Governor's Drought & Water Supply Advisory Committee



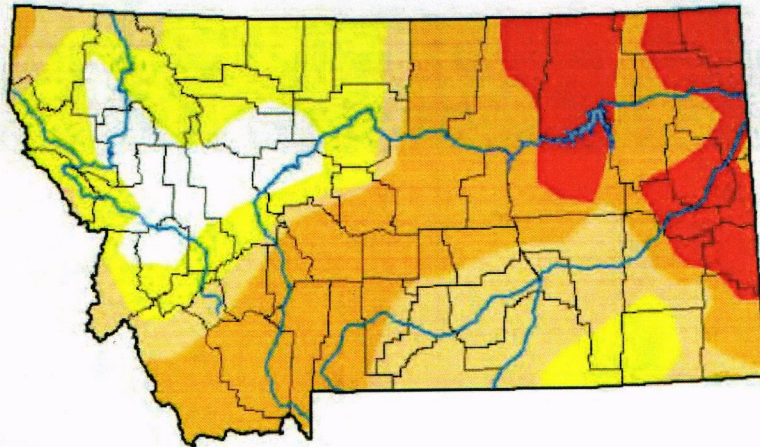
Summary of Antecedent and Current Conditions

The onset of current drought conditions across the Northern Great Plains began in the late summer and fall of 2020. The 2020 Water Year (October 2019 to September 2020) closed with higher than average temperatures and much below average precipitation in August and September. The fall precipitation that sprouts Montana's typical fall "green-up" and coincident improvements in soil moisture following the growing season failed to materialize. The warm and dry weather pattern carried into the first part of October with high temperatures setting some daily records across the state. So began a pattern of weather extremes that characterized conditions for the following eight months.

Heavy snowfall across much of the state and much colder than average temperatures in late October jump started snow accumulation in the mountains. However, much above average temperatures and below average precipitation in November, December and January made for a warm, dry and open winter in the low and mid-elevations. This trend changed sharply with the arrival of the Polar Vortex in February as temperatures plunged and most of the state received above normal precipitation. The uncharacteristically dry March and April, coupled with the warm and dry winter, resulted in abnormally dry to extreme drought conditions taking hold across much of Montana by the end of April. Despite above average to near average precipitation and cooler than normal temperatures in May, deficits from the previous eight months were too large to overcome the persistent dryness. Gains in May were quickly offset by record setting high temperatures and below normal precipitation in June.

U.S. Drought Monitor Montana

June 22, 2021
(Released Thursday, Jun. 24, 2021)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.77	91.23	68.60	47.84	14.25	0.00
Last Week 06-15-2021	10.25	89.75	58.89	32.71	10.55	0.00
3 Months Ago 03-23-2021	19.97	80.03	37.21	17.16	0.44	0.00
Start of Calendar Year 12-29-2020	36.37	63.63	34.41	8.27	0.36	0.00
Start of Water Year 09-29-2020	11.86	88.14	40.59	4.22	0.02	0.00
One Year Ago 06-23-2020	47.74	52.26	14.51	1.74	0.00	0.00

Intensity

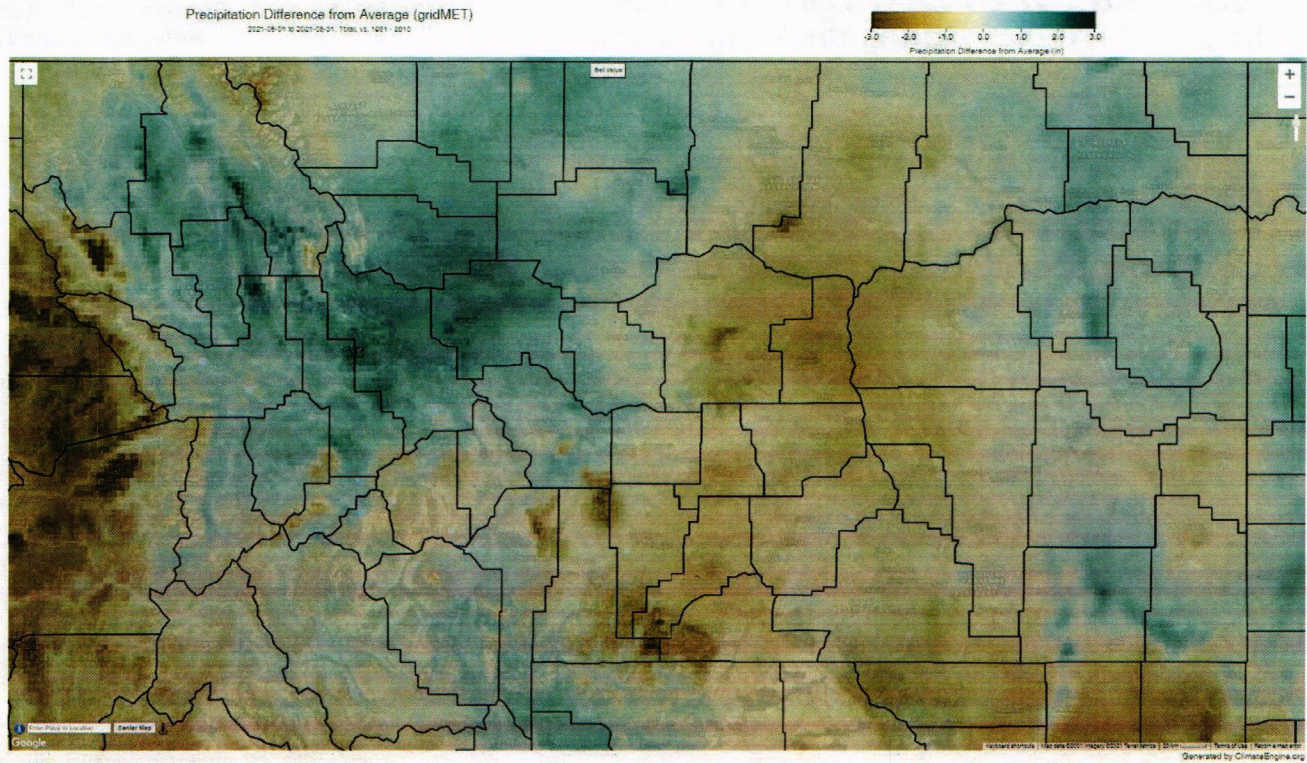
None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author

Curtis Riganti
National Drought Mitigation Center

Precipitation difference from Average – May 2021 – Tan to Brown indicates areas with lower than normal precipitation



Seasonal Drought Forecast

The end of June marks the end of Montana's high precipitation months and the onset of the typically hot and dry summer season. As of June 22nd, the US Drought Monitor indicated that approximately 91% of Montana is in D0 (abnormally dry) to D3 (extreme) drought classification. Approximately 14% is in D3, 34% is in D2 (severe drought) 21% is in D1 (moderate drought), and 23% is in D0. The potential for significant summer precipitation in the coming weeks is quickly waning, although regional summer precipitation can materialize as late as mid-July. After that, summer precipitation is mostly limited to thunderstorms which can be significant locally. NOAA's Climate Prediction Center [one-month weather forecast](#) points to a 40% to 50% percent chance for above normal temperatures and below normal precipitation. The [three-month](#) outlook is similar.

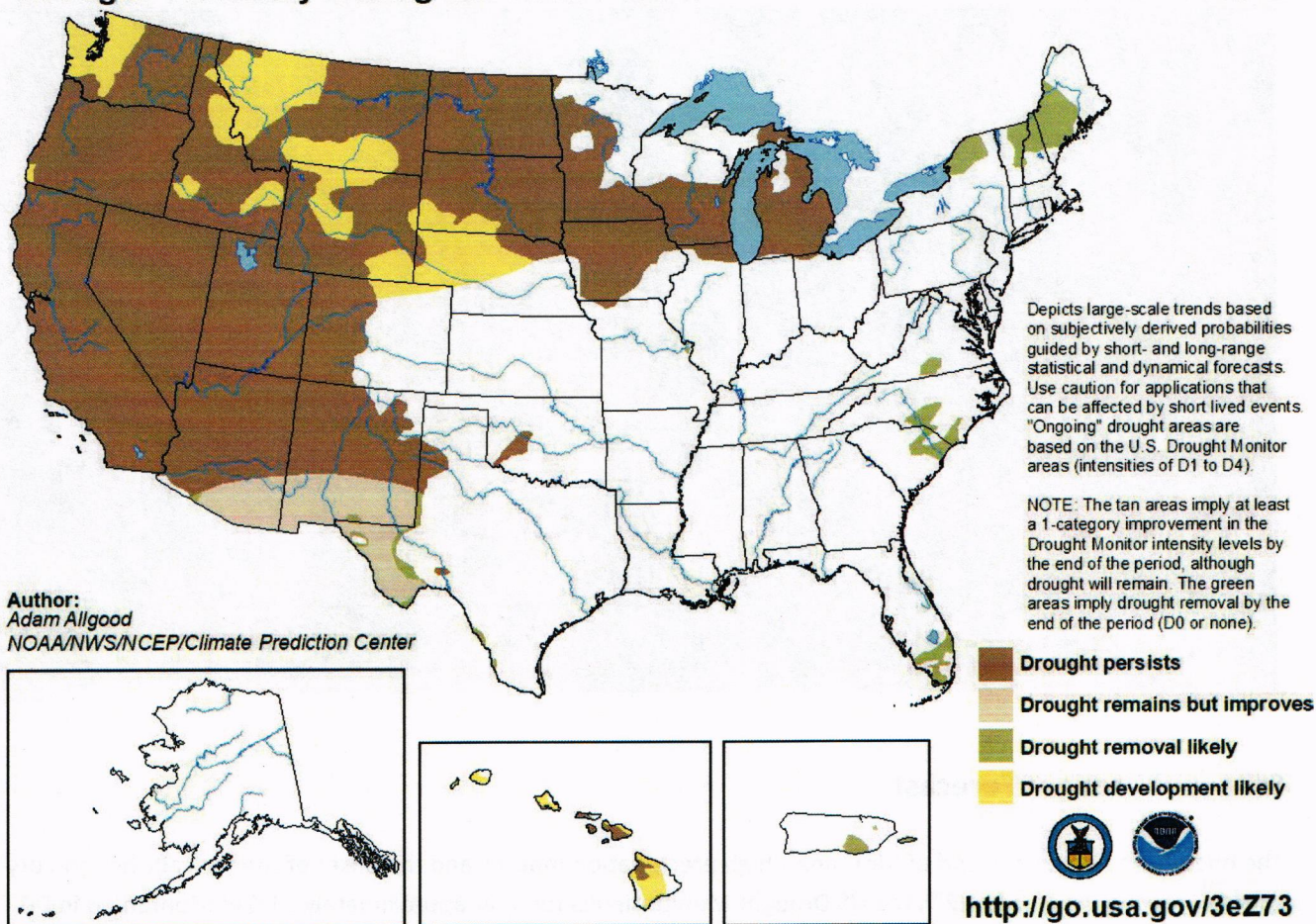
The USDA used the "Fast Track" Drought Disaster declaration process this spring to declare a drought disaster in multiple counties across Montana. The Fast-Track Declaration is triggered when a county, or contiguous county is classified in D2 drought (severe) for 8 or more weeks during the growing season or when an area is identified in D3 (extreme) or D4 (exceptional) drought. Currently, the USDA has identified the following counties as drought disaster areas: Big Horn, Carbon, Powder River, Fallon, Richland, Roosevelt, Sheridan, Wibaux, Phillips, Valley, Petroleum Garfield, McCone, Prairie, Rosebud, and Custer.

This summer's seasonal drought outlook closely mirrors the current U.S. Drought Monitor Map (on page 1 above). Over the course of the next eight to ten weeks drought conditions will likely worsen across most, if not all, of Montana.

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for June 17 - September 30, 2021
Released June 17

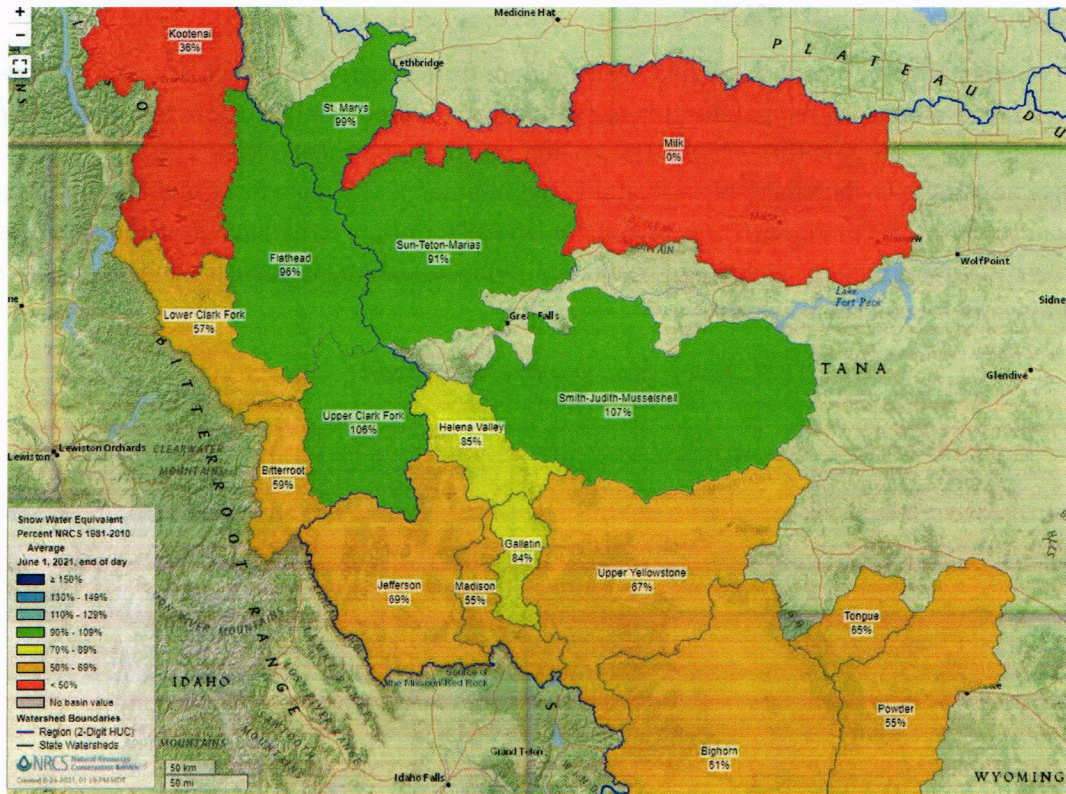


In evaluating weekly drought conditions, Montana's drought monitoring group relies on reports from the field to inform decision making. Producers, recreationists, land managers and others can provide site specific reports of conditions through the [Montana Drought Impact Reporter](#). Maps, links and other drought information specific to conditions in Montana are provided there also.

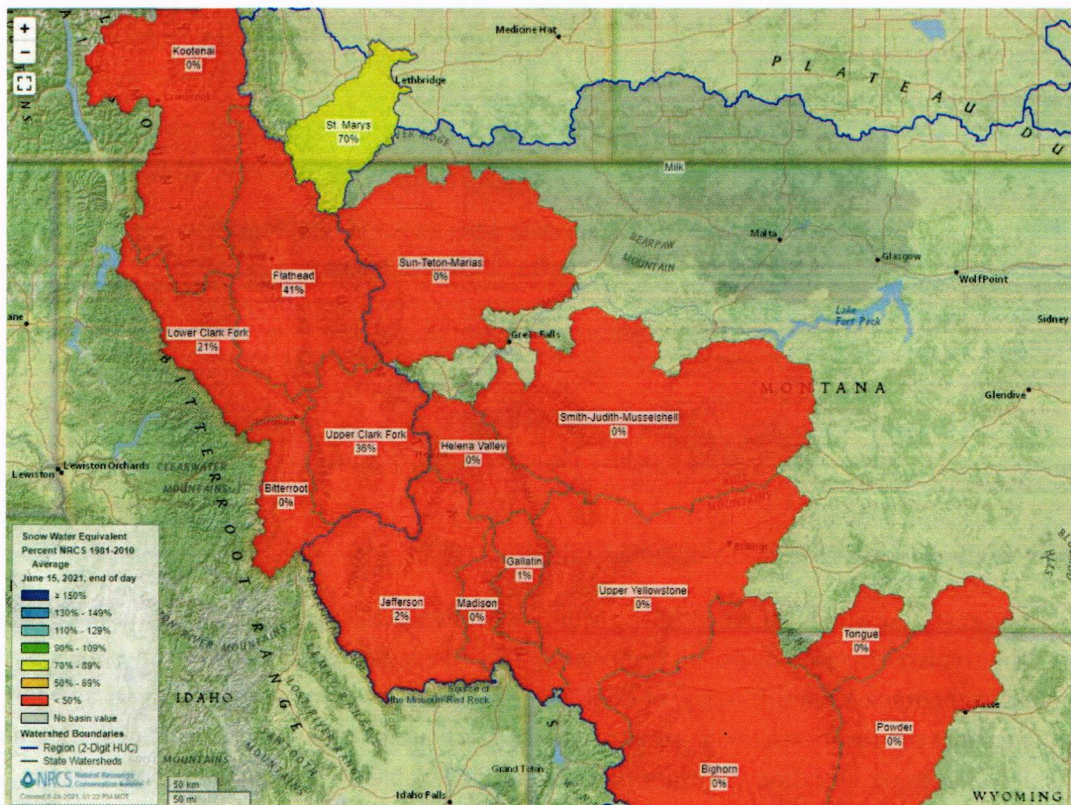
Snowpack – Overview:

Snow totals across the state on June 1st varied widely due mainly to weather patterns in April and May. Much of the low and mid-elevation snow melted in April; however, cooler temperatures preserved the high elevation snow. Throughout May, snowmelt occurred at all elevations. At the very end of May and in the first two weeks of June, snowmelt accelerated at a stunning rate, which moved a significant amount of snow water into rivers and streams. In western and southwest Montana, this early melt resulted in a snowpack that was well below normal on June 1st. By June 15th, virtually all the high-elevation snowpack had melted, with only the Clark Fork, Flathead and St. Mary's drainages retaining measurable snowpack.

Snow Water Equivalent as a percentage of average, June 1, 2021



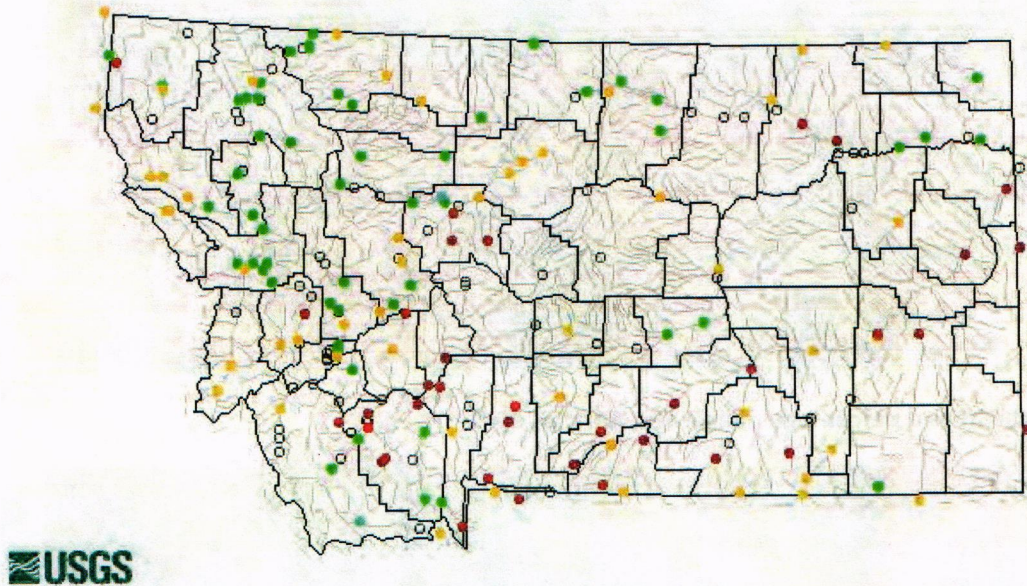
Snow Water Equivalent as a percentage of average, June 15, 2021



Streamflow: ([DNRC/USGS/MBMG Gaging Stations](#), [USGS Water Watch Dashboard](#), [Missouri Basin Forecast Center](#), [Northwest River Forecast Center](#))

The dry fall, compounded by mostly warm and dry conditions from December through April, below average snowpack, and record-breaking temperatures in early June, has resulted in much below and, in some cases, record low stream flows. The early pass-through of water on non-reservoir-controlled systems means that less water will be available when irrigation demand is highest later in the summer. Low stream flows and high temperatures will also have a negative impact on riparian species, habitat, and all forms of recreation associated with these areas. Diminished water tables could result in groundwater well depletion, affecting domestic and municipal resources, in addition to water for stock and wildlife.

Wednesday, June 30, 2021 09:30ET



Search USGS streamgage

Choose a data retrieval option and select a location on the map

☐ List of all stations ☒ Single station ☐ Nearest stations ☐ Peak flow

Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

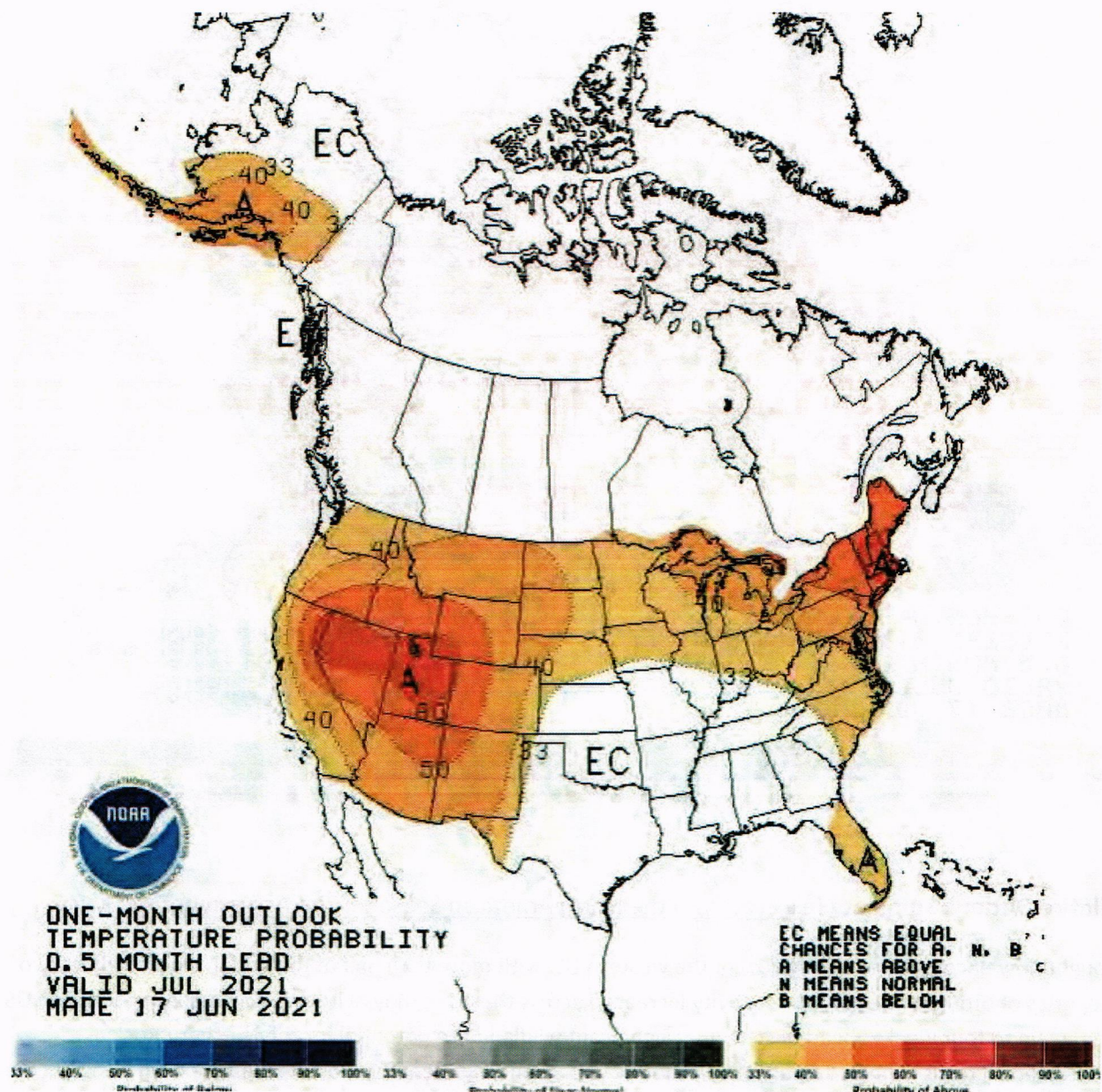
Reservoirs: ([Bureau of Reclamation Reservoirs](#), [State Reservoirs](#))

Water elevations at state-owned reservoirs across Montana were mostly normal to above normal as of June 1st. Conditions at the smaller irrigator-controlled reservoirs across the state are mixed and many small reservoirs in the eastern half of Montana are much below normal. Some of these areas are already facing challenges providing stock-water and some producers are taking steps to reduce herd numbers due to concerns over forage and stock water availability. Reservoir elevation status for July 1st was unavailable in time for this report.

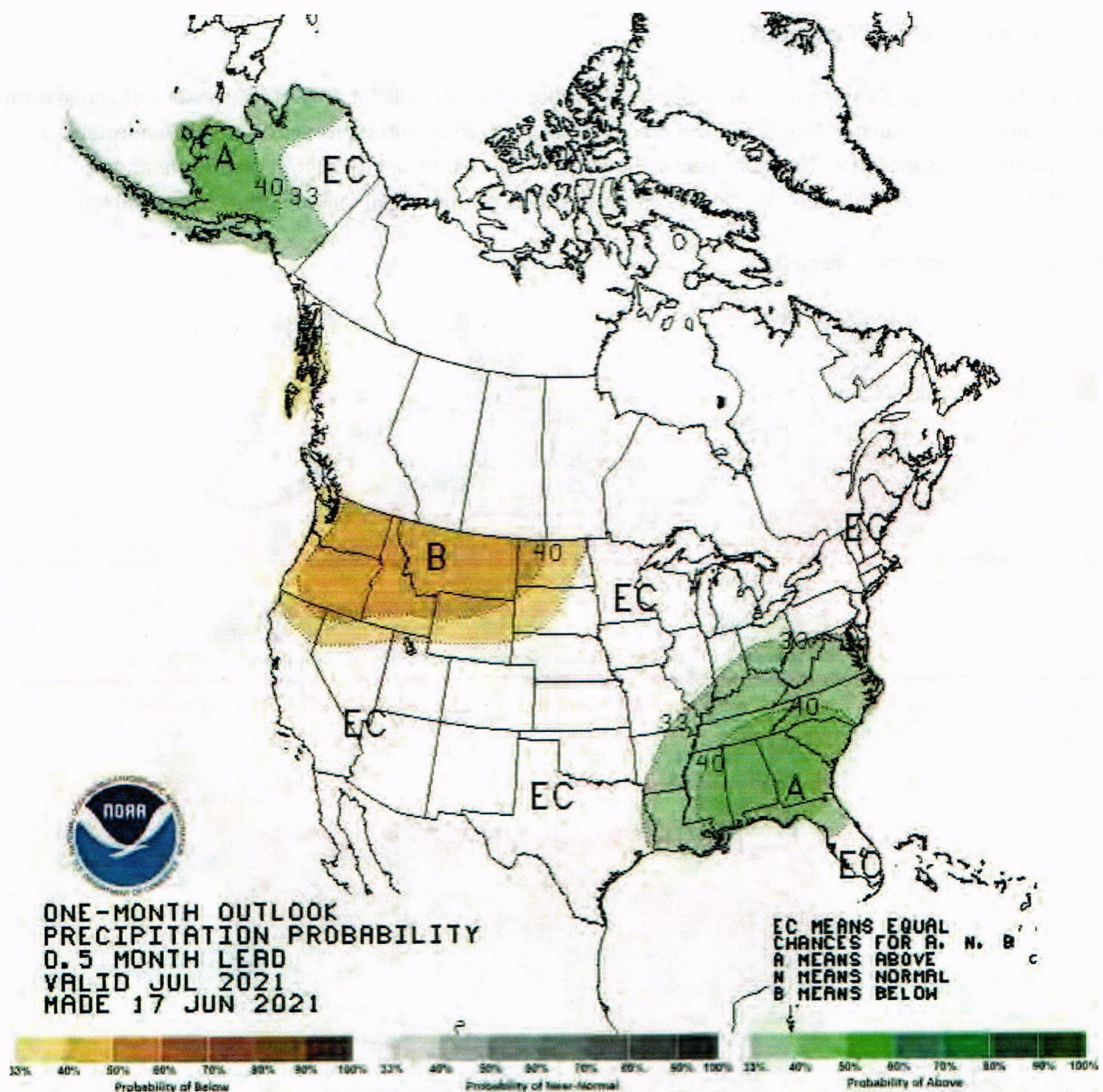
Long Term Weather Forecast:

The [Climate Prediction Center's](#) current temperature outlook for July calls for 40% to 50% chance of above normal temperatures across much of Montana. The precipitation outlook indicates a forecast for below normal precipitation across the state. The maps below show the 1-month forecast for both temperature and precipitation. The 3-month forecast is similar, although the longer timespan makes it much less reliable.

1 Month Temperature Forecast:

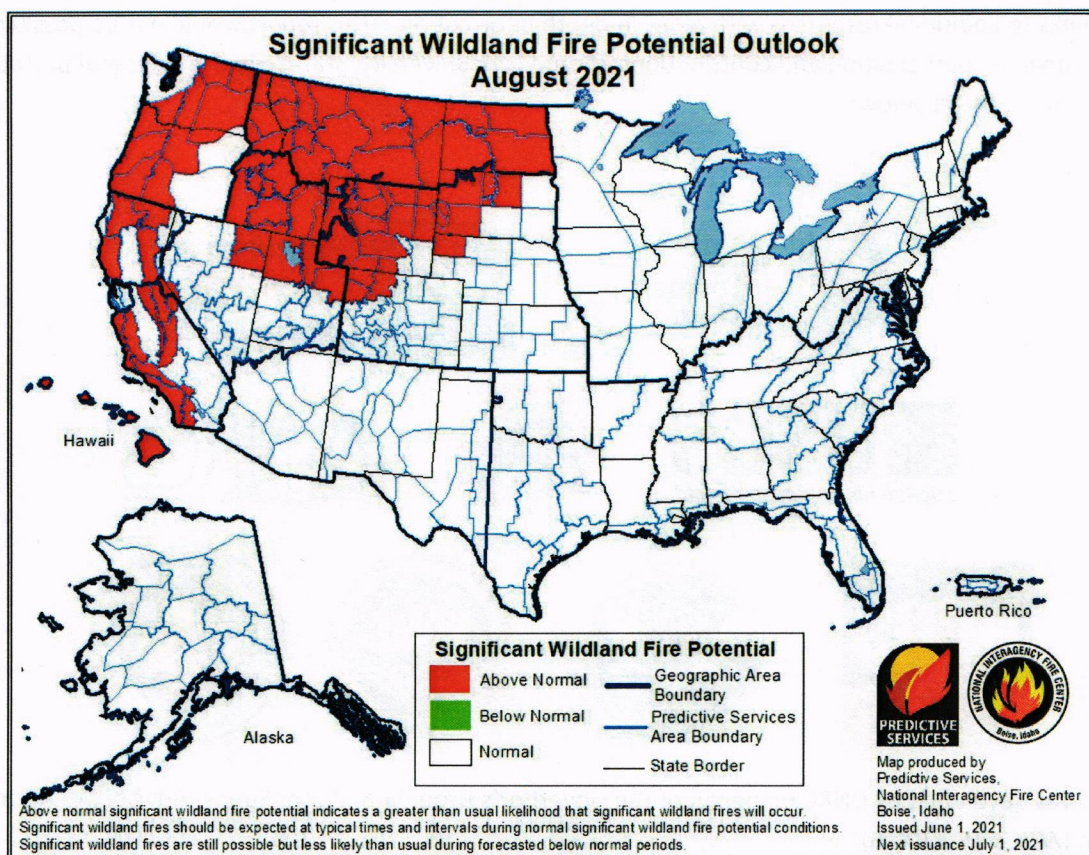
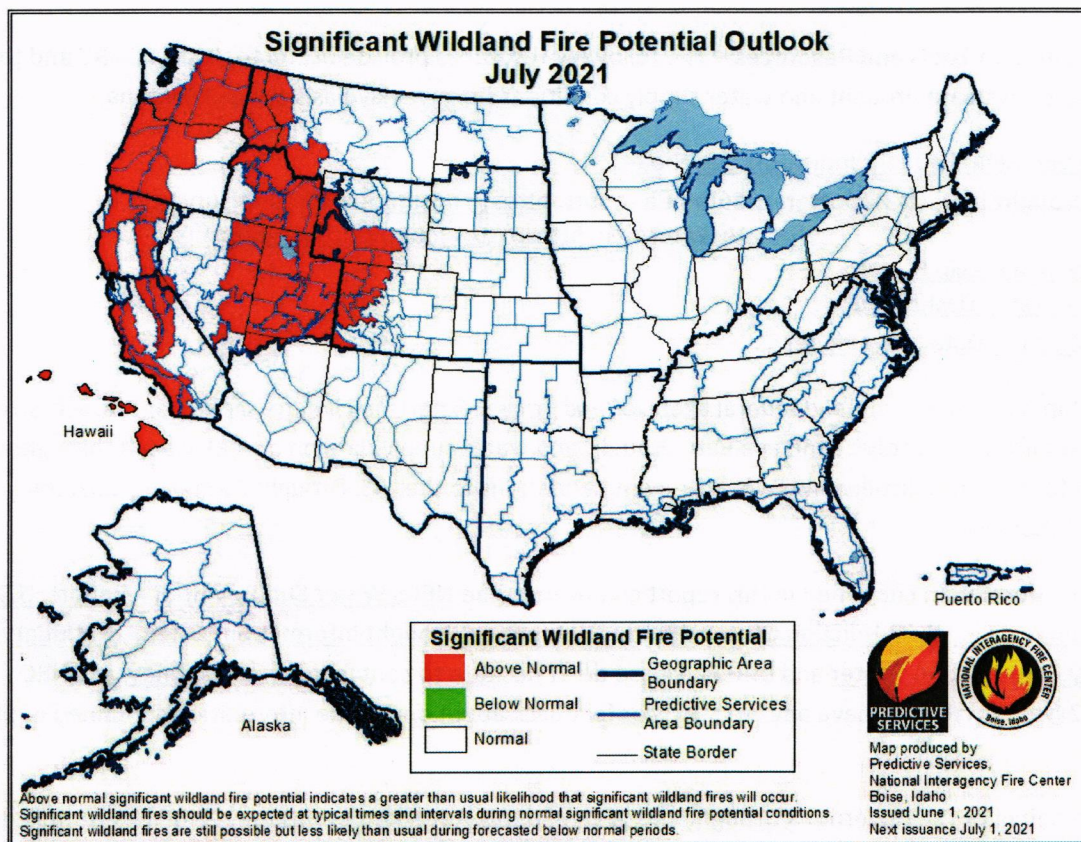


1 Month Precipitation Forecast:



Wildfire Outlook Summary ([excerpt from the North American Seasonal Fire Assessment 6/11/21](#)):

Drought now encompasses nearly 90% of the western US, with more than half of the region in the highest two categories of drought intensity. Fire activity increased across the US in May, with fuel dryness in the western US mostly two to four weeks ahead of schedule. Significant wildland fire potential for the Northern Rockies Geographical Area is expected to be normal in June and again in September. However, above normal significant fire potential will shift northward into the Intermountain West in July, with much of the Great Basin and northern and central Rockies forecast to have above normal significant fire potential by August.



Drought Evaluation Tools and Resources – The following resources provide useful tools that DNRC and their partners use to evaluate drought and water supply conditions on a weekly basis across Montana.

[Upper Missouri River Drought Indicators Dashboard](#)

Montana Drought Impacts Reporter - Submit a report: <https://nris.mt.gov/droughtsurvey>
View results: <https://nris.mt.gov/droughtimpacts>

[NRCS Interactive Precip Portal](#)

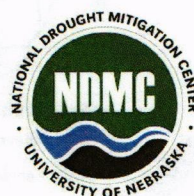
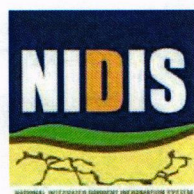
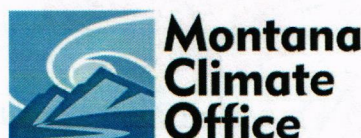
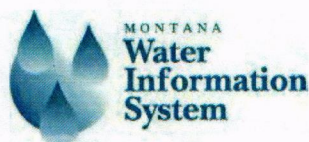
[USGS Water Watch Dashboard](#)

[Montana Mesonet Data Downloader](#)

In partnership with other state and federal agencies and Tribes, experts in climate science, snowpack, streamflow and weather information collect and evaluate drought and water supply data on a weekly basis throughout the year. This information is distilled into weekly recommendations to the U.S. Drought Monitor, which tracks drought conditions nationally.

Much of the information contained in this report comes from the [NRCS Water Supply Outlook Report](#), [U.S. Drought Monitor](#), [Climate Prediction Center](#), [National Integrated Drought Information System](#), [National Interagency Coordination Center](#) and others. Please don't hesitate to contact [Michael Downey](#), at DNRC (mdowney2@mt.gov) if you have any questions or feedback about any of the information contained in this report.

Working on behalf of the Governor's Drought and Water Supply Advisory Committee, DNRC has compiled this Summer Drought Forecast. This report provides a synopsis of statewide conditions gleaned from multiple sources and offers links to additional resources with more in-depth information. This report would not be possible without the ongoing participation and contributions of our local, university, state, tribal and federal partners, some of which are listed below:



This report was developed by DNRC on behalf of the Governor's Drought & Water Supply Advisory Committee pursuant to MCA 2-15-3308(5).

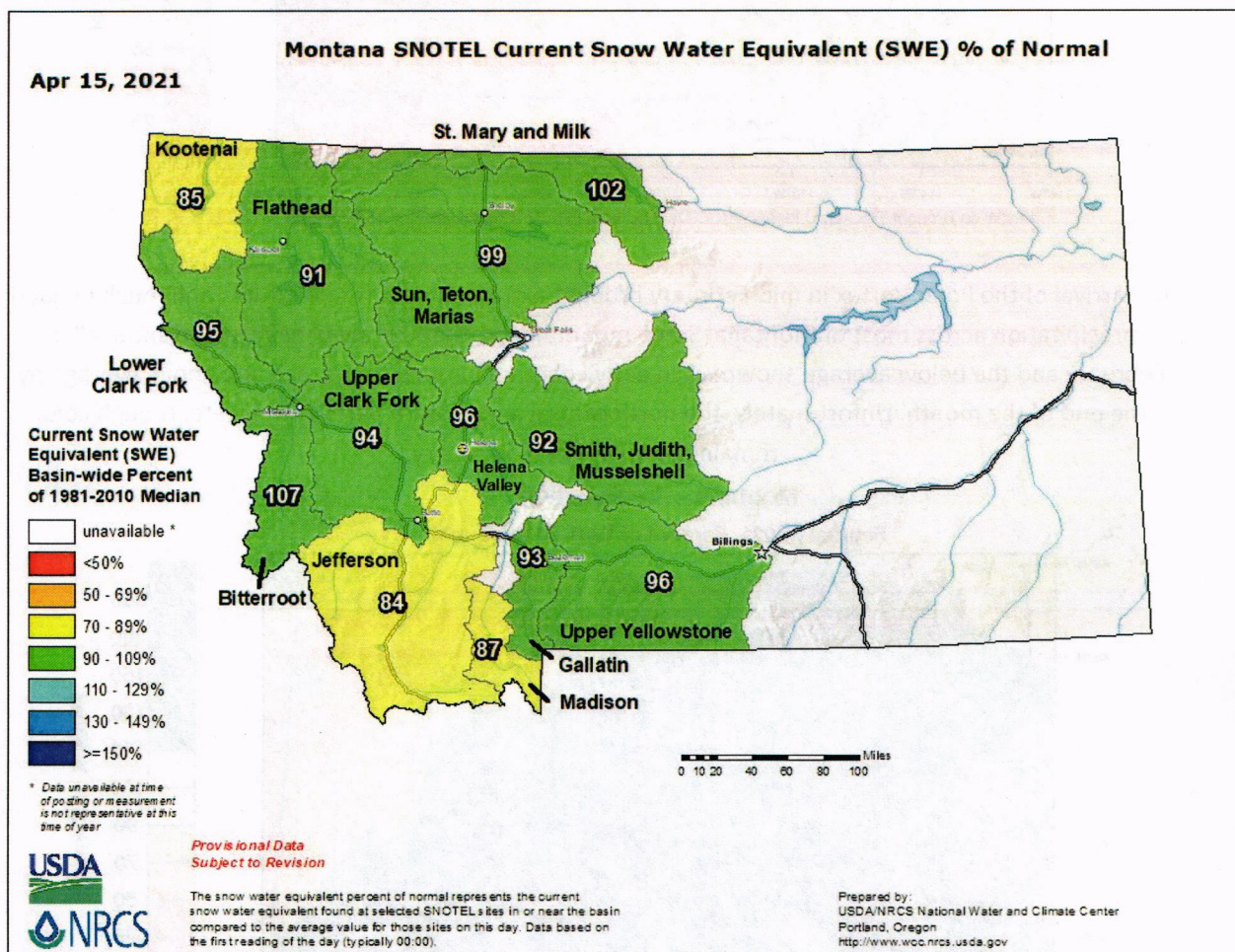


Montana Water Supply & Drought Outlook – Spring 2021

Water Supply Overview:

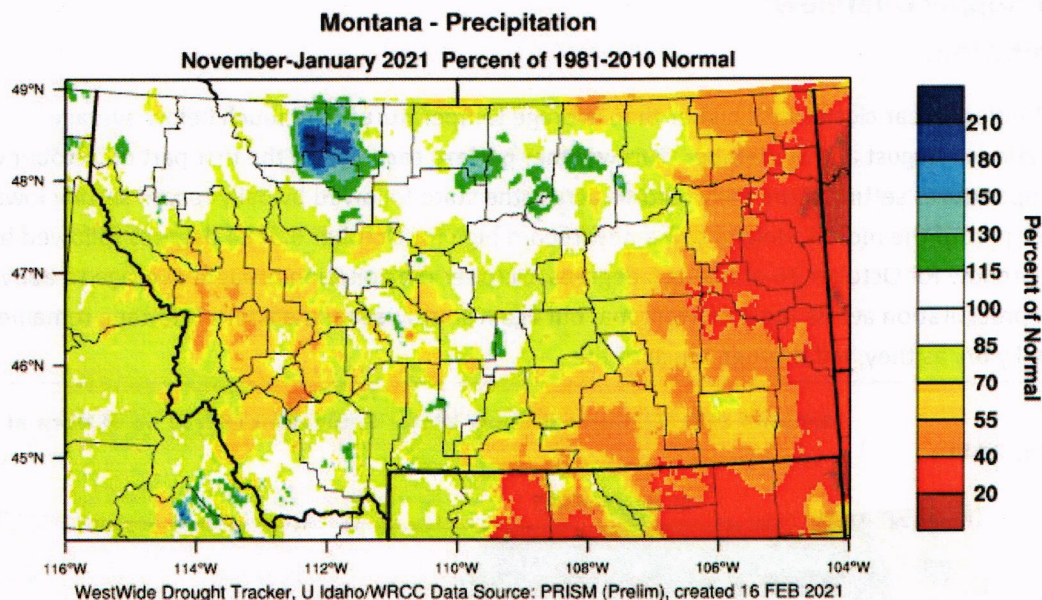
Precipitation:

The 2020 Water Year closed with higher than average temperatures, and much below average precipitation in August and September. This weather pattern carried into the first part of October with high temperatures setting some daily records across the state followed by daily record setting lows in the latter part of the month. Helena saw a new record high for October 6 of 84 degrees followed by a new record low for October 26 of minus 6 degrees. October precipitation brought average to above average precipitation across most of Montana, but again southwest and eastern Montana remained abnormally dry as they had through much of the

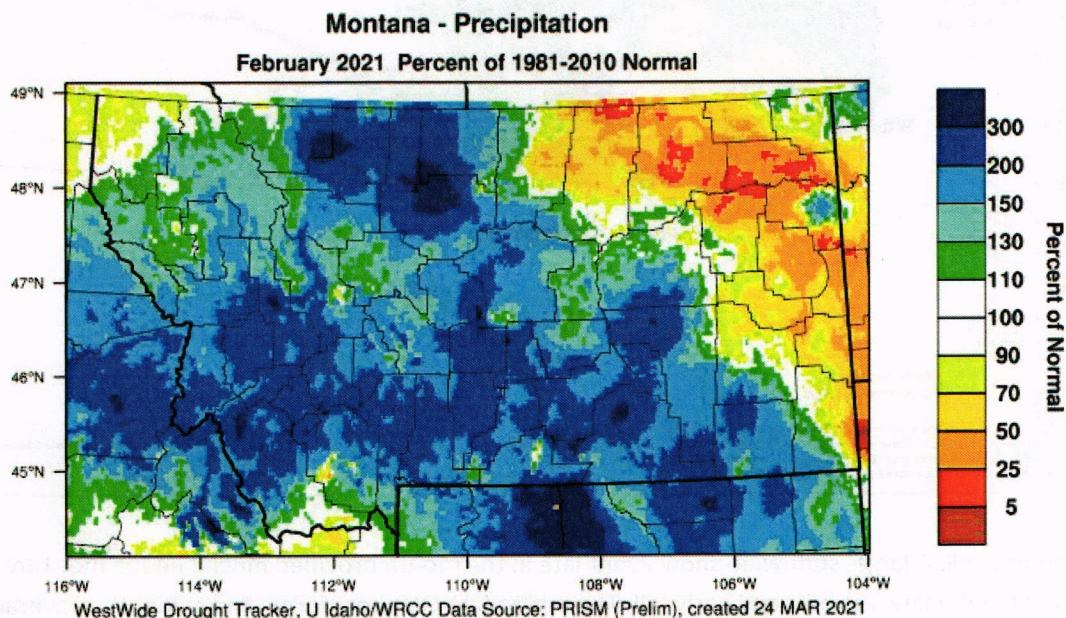


summer and fall. A large, statewide snow event late in the month provided much needed moisture following the dry late summer and early fall. The mid to late October storms and colder than average temperatures jump started snow accumulation in the mountains. The early, heavy snowfall and cold

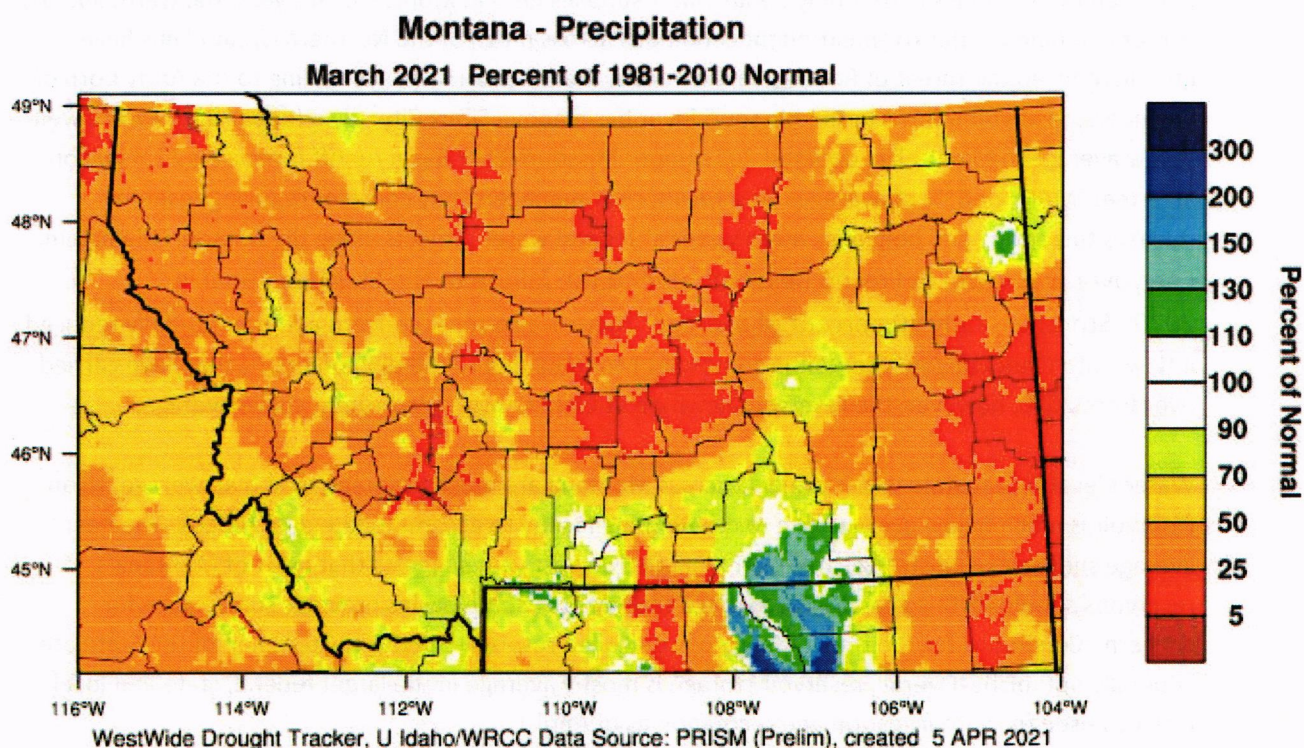
temperatures seemed to indicate that projections for the La Niña weather pattern for the winter would come to fruition. However, much above average temperatures and below average precipitation across the state in November, December, January, and the first half of February made for a warm, dry and generally open winter in the low and mid-elevations across Montana. The high elevations did continue to increase snowpack through these months but at diminished rates.



The arrival of the Polar Vortex in mid-February brought extremely cold temperatures and much needed precipitation across most of Montana. Some mountain locations received near record snowfall in February and the below average snowpack in early February jumped to average and above average by the end of the month. Unfortunately, the north central and eastern parts of the state, though cold, remained mostly dry in February.



Above average temperatures and below average precipitation in March in addition to warm and windy conditions continued to dry out the prairie while the accumulation of the mountain snowpack flattened sharply following February's heavy snowfall. Despite the topsy-turvy temperatures and sporadic precipitation throughout much of the winter, snowpack at the end of March was near average to above average with the exception of the Upper Madison, Jefferson, and Kootenai river drainages which fell to well below average (see map on page 1).



Streamflow: ([DNRC/USGS/Gaging Stations](#), [USGS WaterWatch](#), [Missouri Basin River Forecast Center](#))

Peak snowpack in most mountain locations typically occurs sometime during April. Statewide, the snowpack currently varies from near to above average, to well below average. As a result, the translation of current snowpack into summer stream forecasts remains somewhat uncertain and will depend on temperatures and the effect that has on the rate of snowmelt. Warmer temperatures will accelerate runoff, while cooler than average temperatures could suppress runoff effectively extending the season. The long-term precipitation forecasts for Montana are mostly average so we are very much in a wait and see mode at this point in the season. Snowpack is a critical component of stream runoff across the state, but it's certainly not the only component. Total water year precipitation, peak snowpack accumulation, spring and summer precipitation and the departure from seasonal average temperatures all contribute to the overall water volume available during the growing season. As of this writing, streamflow forecasts in most watersheds across the state are forecast for near average for the April 1st through July 31st period. Runoff forecasts for the Red Rocks (35 to 60% of avg), Ruby (70% of avg), and Madison River (85% of avg) basins look to be well below average this coming runoff season.

Reservoirs: ([Bureau of Reclamation Reservoirs](#), [State Reservoirs](#))

April is generally the time of the year when water managers across Montana start to fill the local, state and federally managed reservoirs across Montana. It is also a time that leaves most water managers and dam tenders feeling uneasy as they consider changing conditions and attempt to anticipate spring runoff and water demands moving into the summer months. It is important to keep in mind that water management in Montana isn't only about water supplies here in Montana. This year, the warm and dry winter combined with extreme drought conditions across much of the Northern Great Plains have greatly reduced the threat of flooding farther down the Missouri River. According to the Army Corp of Engineers, reservoir inflows in the Missouri River basin above Sioux City, Iowa (upper Basin) were well-below average in March. The updated 2021 upper Missouri River Basin runoff forecast is 21.3 million acre-feet (MAF), or 83% of average. As a result, river managers may consider reducing reservoir releases this spring and hold back more water at federal water projects along the Missouri Mainstem. Carryover was lower in Fresno Reservoir due to the failure of the St. Mary Canal in 2020. Storage is only 70 percent of average. There is also some concern about potentially reduced inflows into Clark Canyon reservoir in southwest Montana due to the dry conditions that have carried over from 2020, however, the reservoir elevation at Clark Canyon is currently above average.

Water elevations at state water projects across Montana are mostly average to above average. Nilan reservoir is much below average due to draining the facility to accommodate dam repairs. The near average snowpack and strong carry-over storage from last year suggests that most of Montana's reservoirs should fill this year. Below average snowpack in some basins provides some cause for concern. Conditions for the smaller irrigator-controlled reservoirs in the western half of the State are generally optimistic. Overall, reservoir storage is mostly average in the larger federal, state and local facilities used for both irrigation and recreation as of April 1.

Storage in small reservoirs and stock water ponds in the eastern two-thirds of the state is low to very low at the time of this writing. April, May and June are typically the wettest months of the year east of the continental divide so there is still time to fill the many dug-outs, potholes, and small reservoirs that many producers rely on for stockwater. Absent at least average precipitation this spring, many producers are likely to have difficulty ensuring adequate drinking water supplies for livestock this summer.

Drought Outlook:

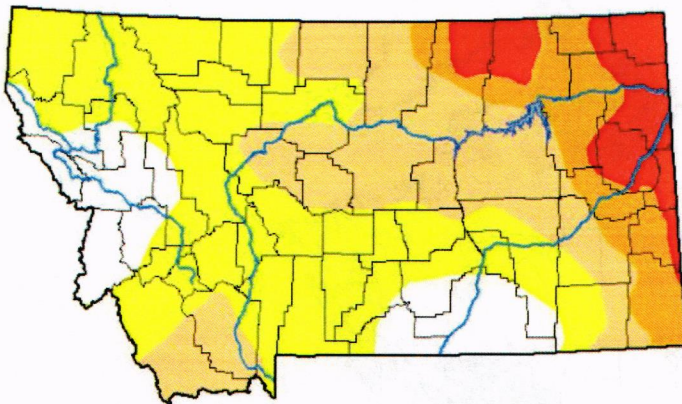
As we move into spring, conditions in Montana couldn't be more different today than they were one year ago. In early April 2020, the U.S. Drought Monitor indicated that only 15% of the state was abnormally dry. Currently, approximately 42% of the state is listed as abnormally dry; 23% is in the D1 (moderate) drought category; 10% is in the D2 (severe) drought; 8% of the area is in D3 (extreme) drought which recently expanded to include parts of Phillips, Valley, Daniels, Sheridan, Roosevelt, Richland, McCone, Wibaux, Prairie, Dawson, Fallon and Carter counties.

The current, abnormally dry and drought conditions across Montana are the result of the combination of overly dry conditions prevalent last fall in addition to the warmer and drier than average conditions

that characterized the winter. While there is still time to for conditions to improve, persistent dryness in eastern Montana may result in continued deterioration of both stream and surface water availability and soil moisture.

The next 8 to 10 weeks is a critical period. Despite the current drought status across much of Montana, there really is time for conditions to improve prior to the onset of summer. In 20 of the last 21 years, parts of Montana have been classified as abnormally dry or in a drought category in early April. In 10 of those years, statewide drought conditions improved between early April and late June, but in 9 of them conditions worsened. In one year, 2014, conditions remained about the same. 2005 offers a noteworthy example. In early April of 2005, 86% of the state was listed in a D2 to D4 drought category. Despite a drier than average April and May, an unusually wet June relieved drought conditions across the state and by September 1st drought conditions had dissipated dramatically. The chances of improving versus worsening drought conditions between early April and the end of June is about 50/50 and will likely vary across of the state. Temperature could also play an outsized role in the equation as it did in 2017 which saw temperatures of 8 to 12 degrees above average by mid-May of that year. Below is the most recent map of the status of current drought classifications from the [U.S. Drought Monitor](https://droughtmonitor.unl.edu/).

U.S. Drought Monitor Montana



April 13, 2021
(Released Thursday, Apr. 15, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	13.53	86.47	44.64	18.74	8.46	0.00
Last Week 04-06-2021	16.52	83.48	43.51	18.06	5.60	0.00
3 Months Ago 01-12-2021	18.97	81.03	34.50	8.27	0.36	0.00
Start of Calendar Year 12-29-2020	36.37	63.63	34.41	8.27	0.36	0.00
Start of Water Year 09-29-2020	11.85	88.14	40.59	4.22	0.02	0.00
One Year Ago 04-14-2020	81.36	18.64	0.00	0.00	0.00	0.00

Intensity

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

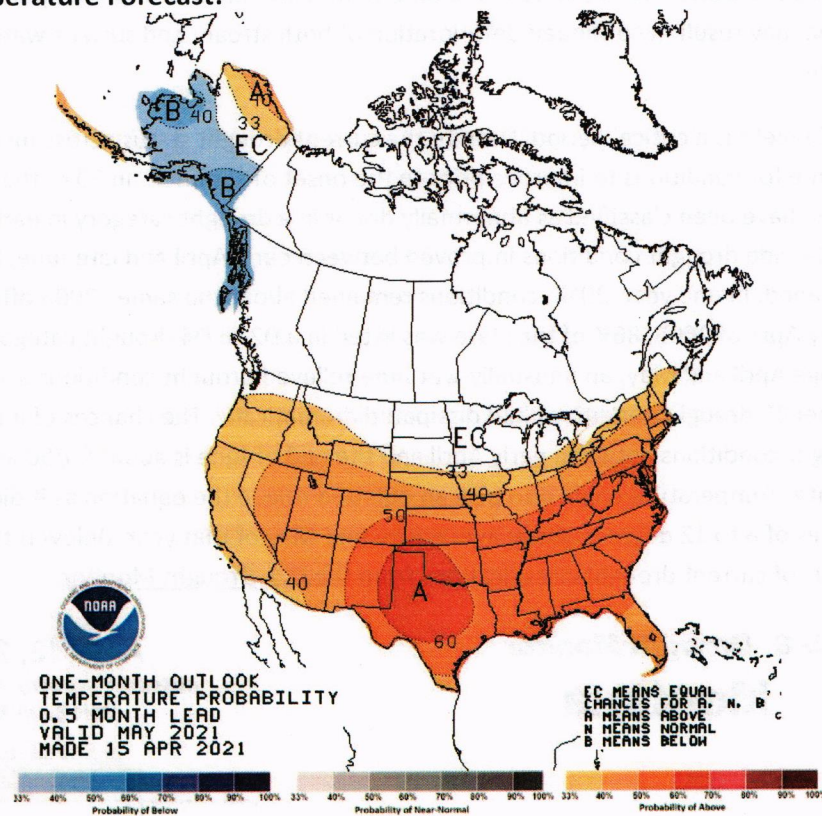
Author

Deborah Bathke
National Drought Mitigation Center

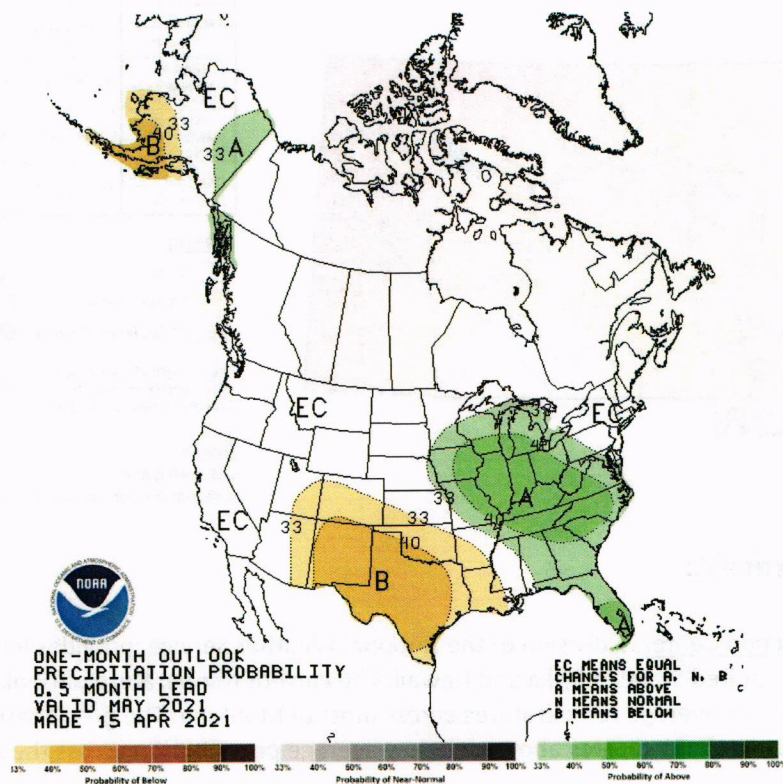
Long Term Forecast:

The [Climate Prediction Center](https://climatepredictioncenter.noaa.gov/), a division of the National Weather Service, provides long-term forecasts for the contiguous United States, Alaska and Hawaii. The current temperature outlook for April calls for a 33% chance of above average temperatures across most of Montana. The precipitation outlook does not offer a clear signal that indicates above or below average precipitation across the state.

1 Month Temperature Forecast:

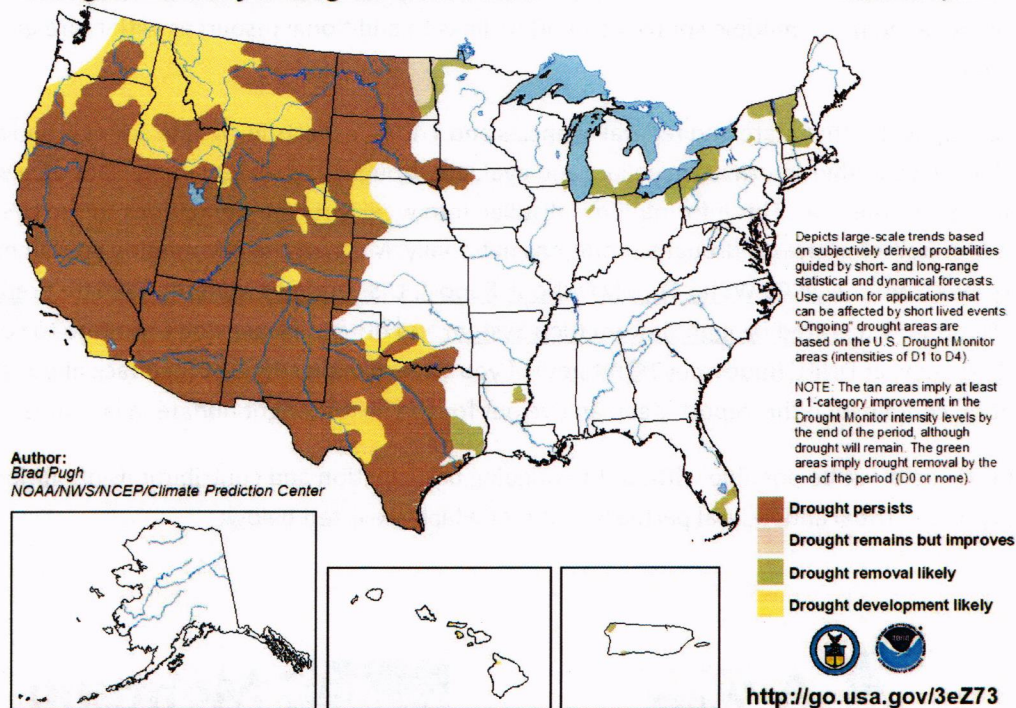


1 Month Precipitation Forecast:



U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for April 15 - July 31, 2021
Released April 15



Water Supply and Drought Outlook Summary

The generally warmer and drier than average weather in the fall and early winter of 2020 and the winter of 2021 makes conditions difficult to interpret as we move into spring and summer. The unusually dry and warm conditions in September, November and December of 2020; warmer than average and dry, open winter across the low and mid elevations; the smattering of inconsistent yet large snow events along with a spate of extremely cold temperatures and storms that generated a near average snowpack makes for an unclear picture of where conditions stand today. It also makes a quick summation of current conditions and what they portend for the next few months a difficult task verging on a fool's errand. The official outlook calls for drought conditions to persist. That is likely an accurate forecast. The question at this point in the season is whether the rains of April, May and June bring some comfort and prosperity or fail giving way to worry and hardship. As we enter the spring with moderate to extreme drought conditions across nearly half of the state, chances for improved conditions between now and the 4th of July are about 50/50 and will likely vary widely depending upon the specific locale.

Drought Evaluation Tools and Resources – The following resources provide useful tools that DNRC and their partners use to evaluate drought and water supply conditions on a weekly basis across Montana.

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Montana Drought Impacts Reporter - Submit a report: <https://nrismt.gov/droughtsurvey>
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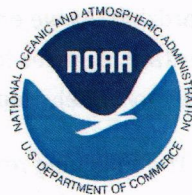
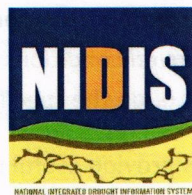
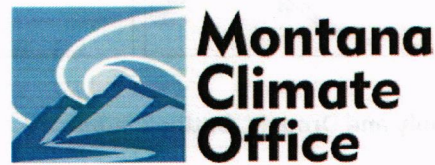
[USGS Water Watch Dashboard](#)

[Montana Mesonet Data Downloader](#)

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This report would not be possible without the ongoing participation and contributions of our local, university, state, tribal and federal partners, some of which are listed below:



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